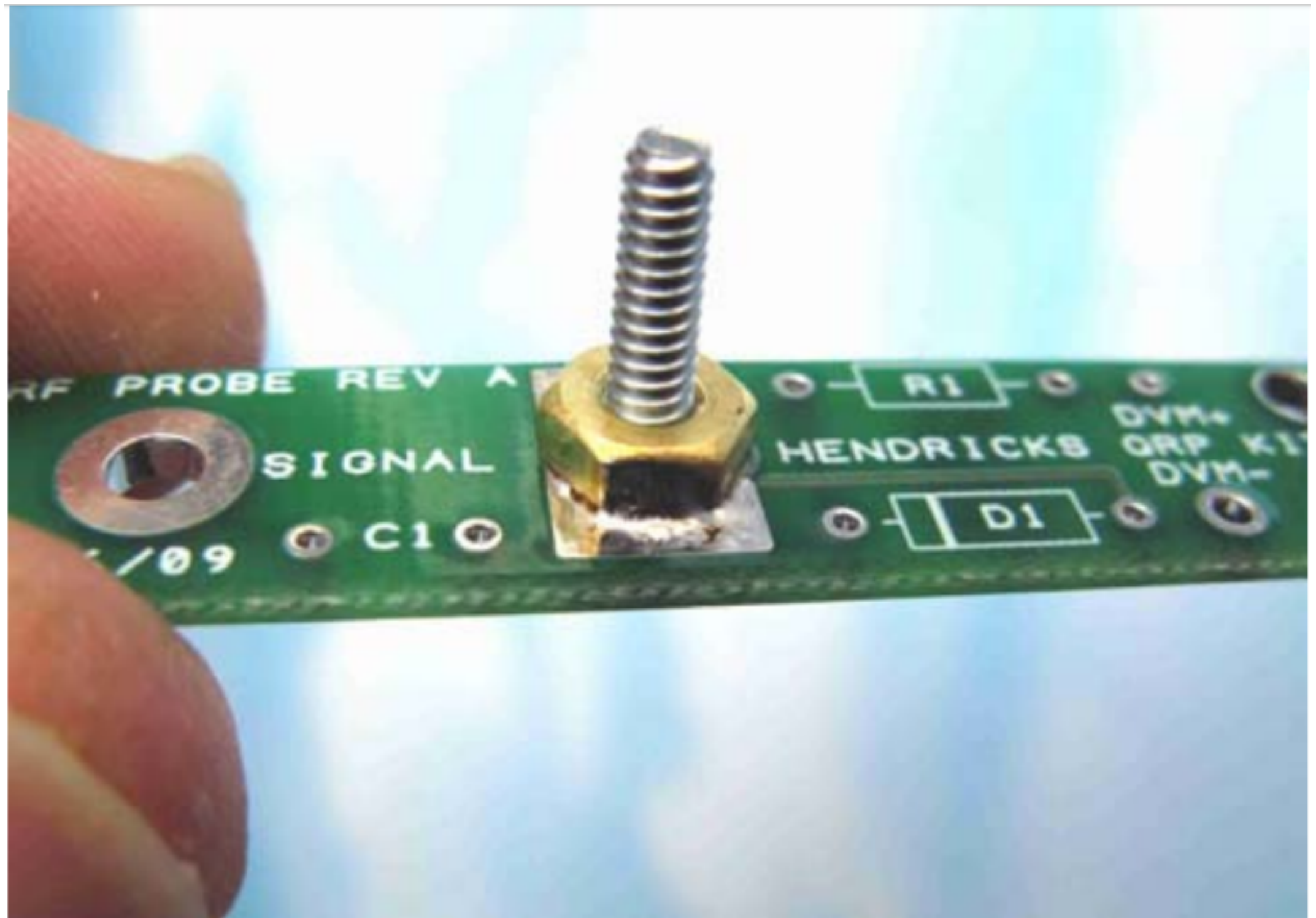
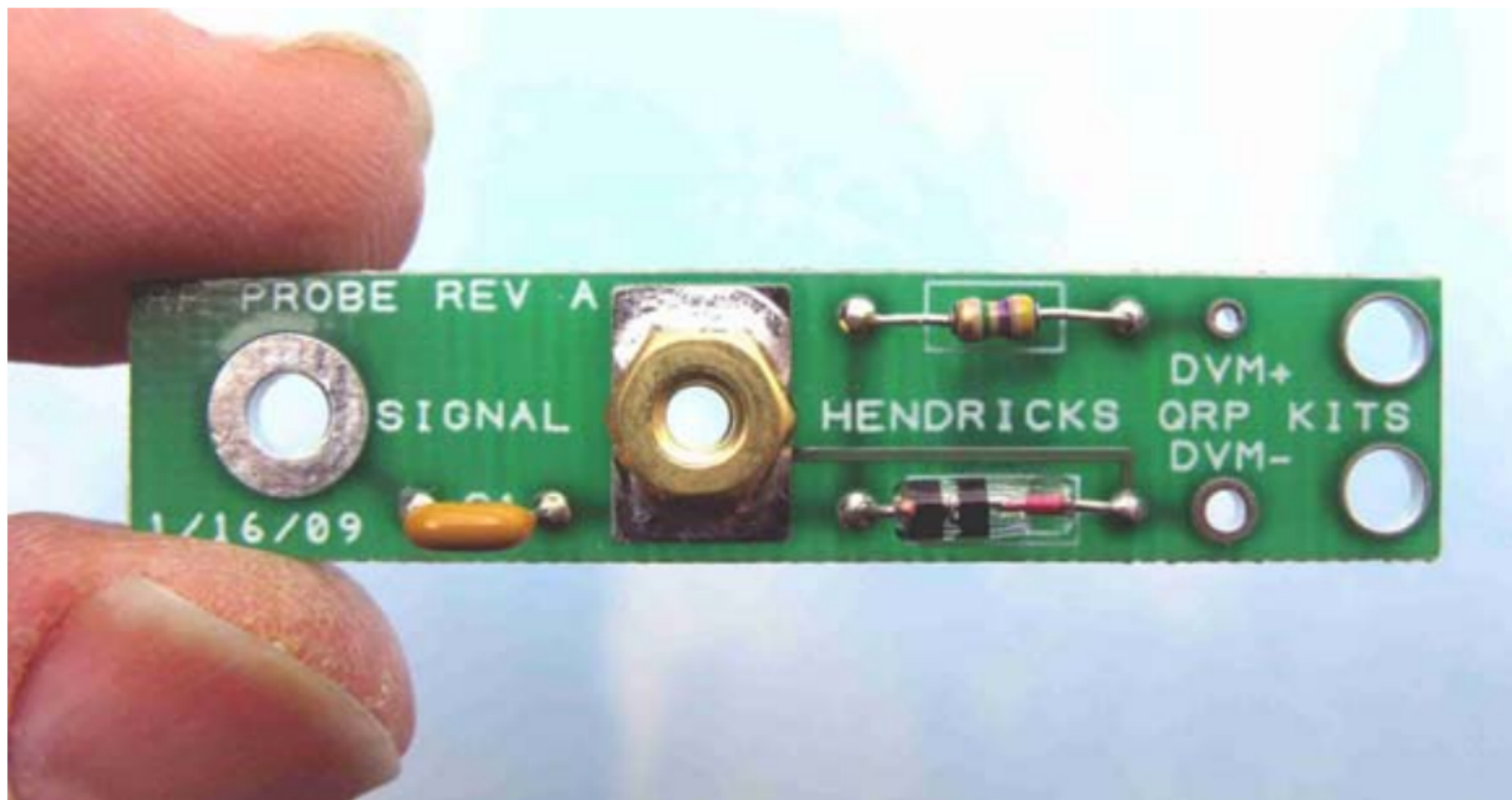


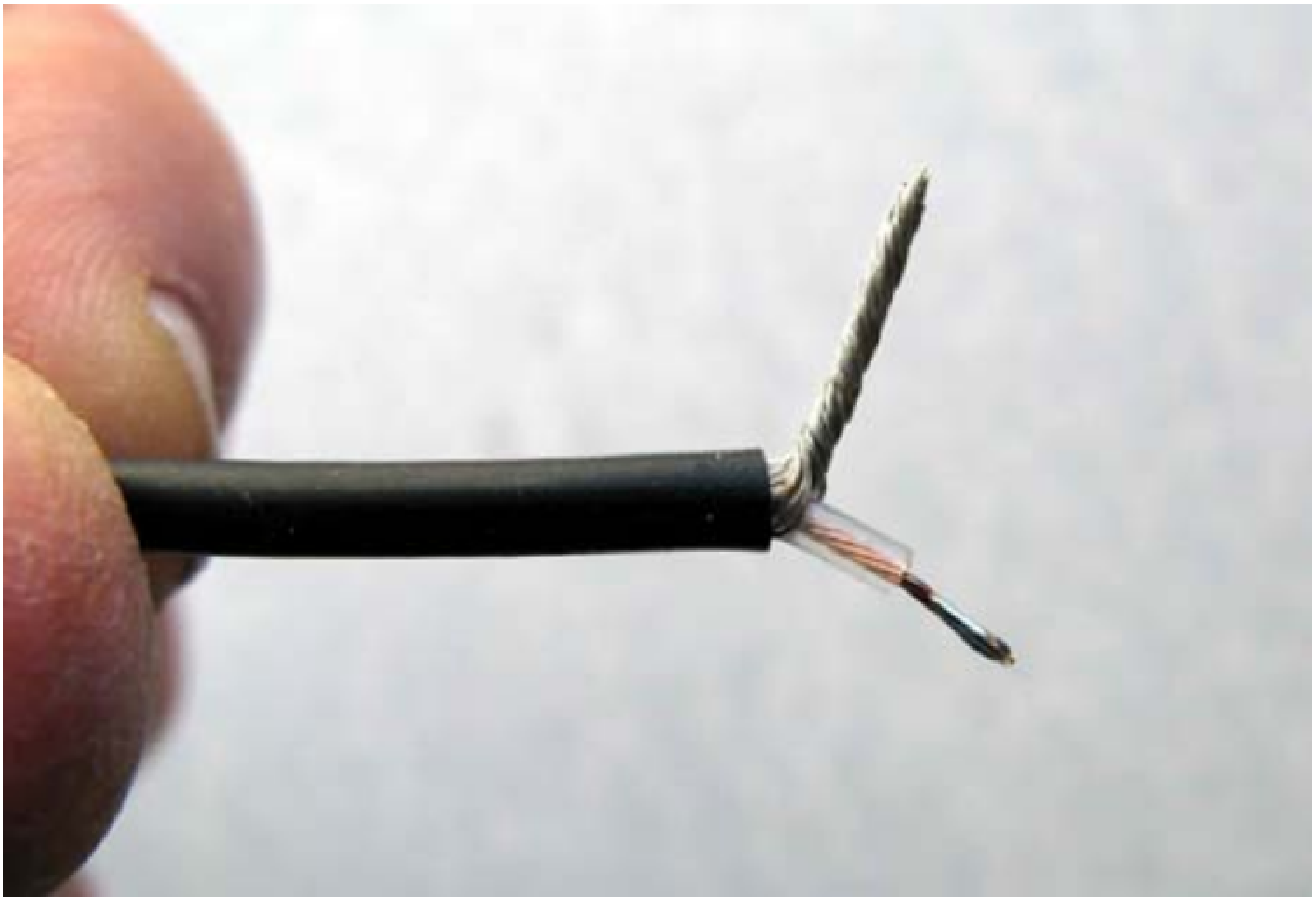


First off, check to see if the parts match the parts list...

- 1 – 1/2" x 3" CPVC tube
- 2 – 5/8" O.D. vinyl caps
- 1 – 3/32" dia x 2.5" brass rod
- 1 – 4-40 x 7/16" pan head screw
- 1 – 4-40 x 1/4" pan head screw
- 2 - #4 internal tooth lock washer
- 1 – 4-40 nut, steel
- 1 – 4-40 nut, brass
- 1 – 3/32 x 2" tyrap
- 2 - #4, 14-16ga ring terminal
- 1 – PCB
- 1 – D1 - 1N34A diode
- 1 – R1 - 4.7M 1/8w resistor (YEL, VIO, GRN, GLD) **See note**
- 1 – C1 - .01 disk ceramic capacitor (103)
- 3' – RG-174 coax
- 2 – banana plugs, 1 red, 1 black
- 2" – 3/16" dia. shrink tubing
- 1 – alligator clip and 9" lead
- 1 - copper foil tape, 2.25" x 2"
- 1 – self adhesive label







RF PROBE REV A



SIGNAL

1/16/09

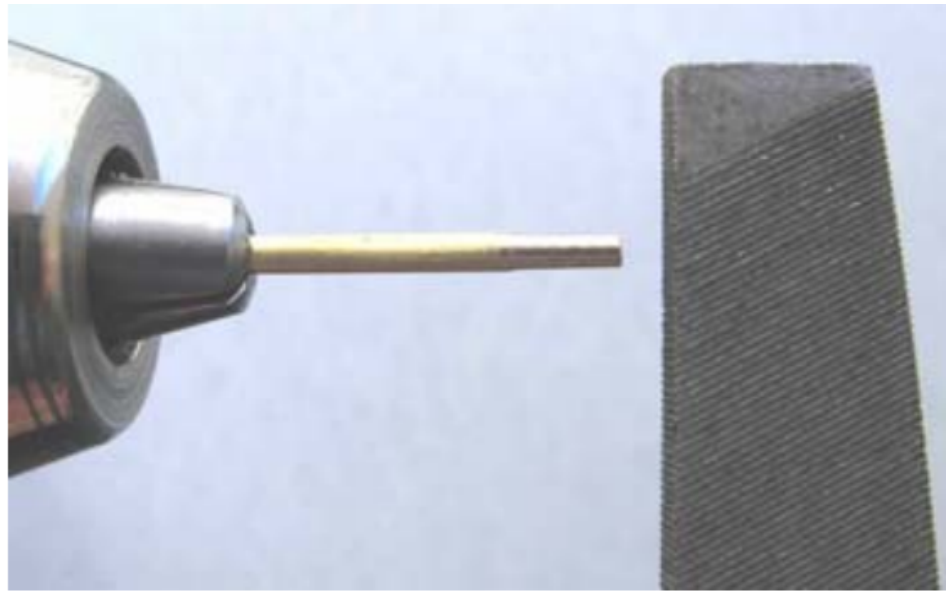
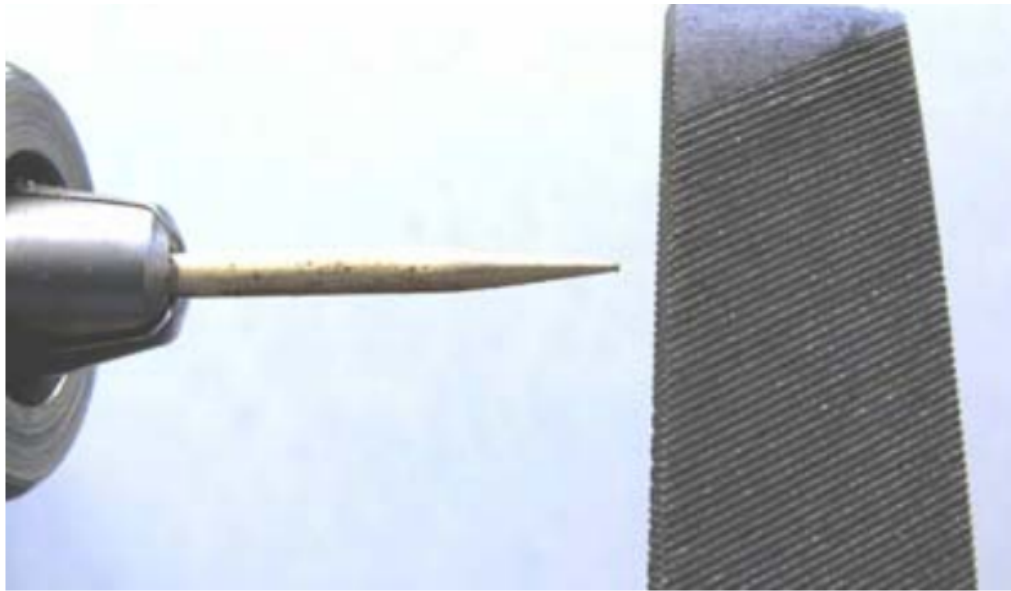


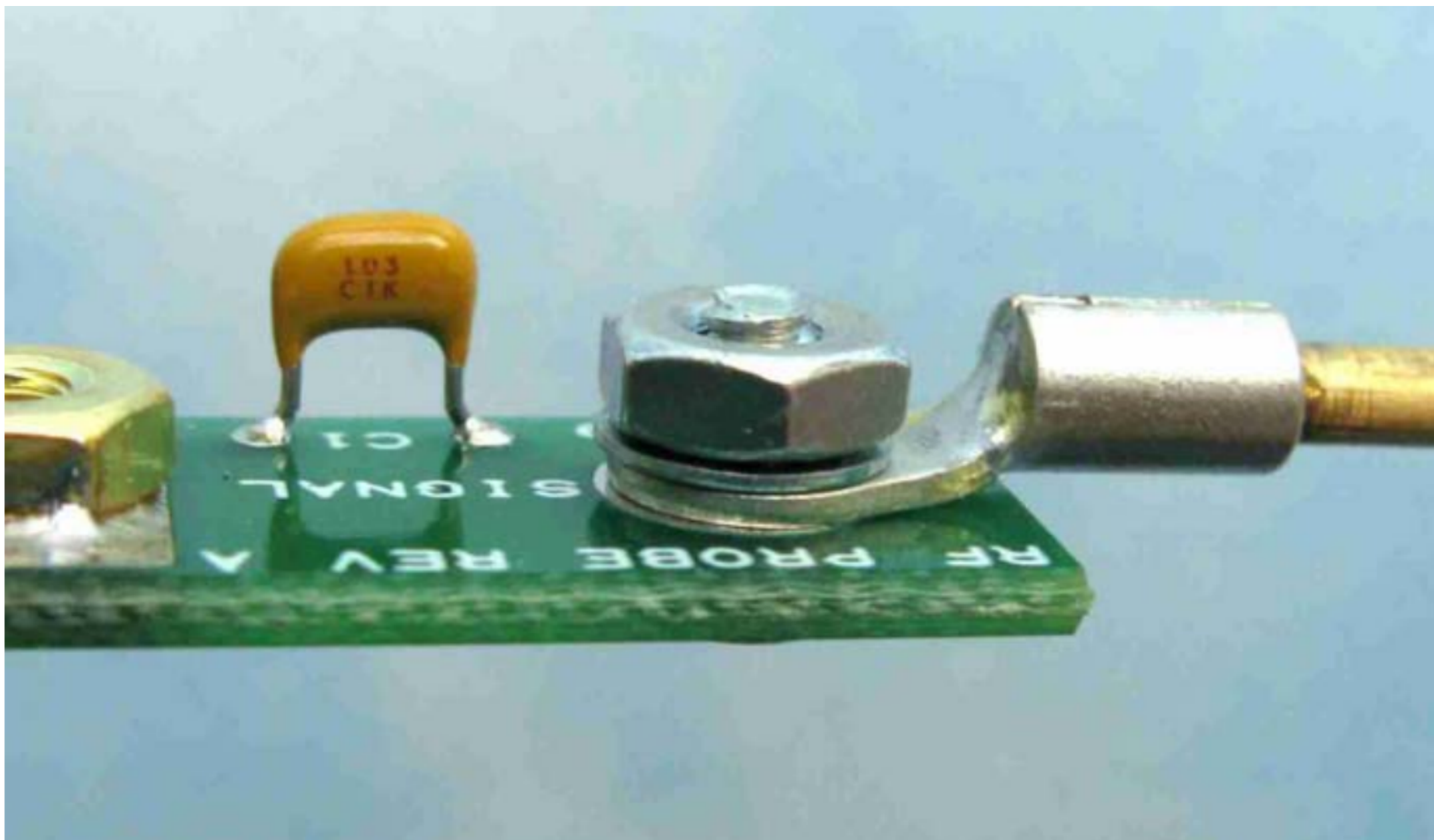
HENDRICKS

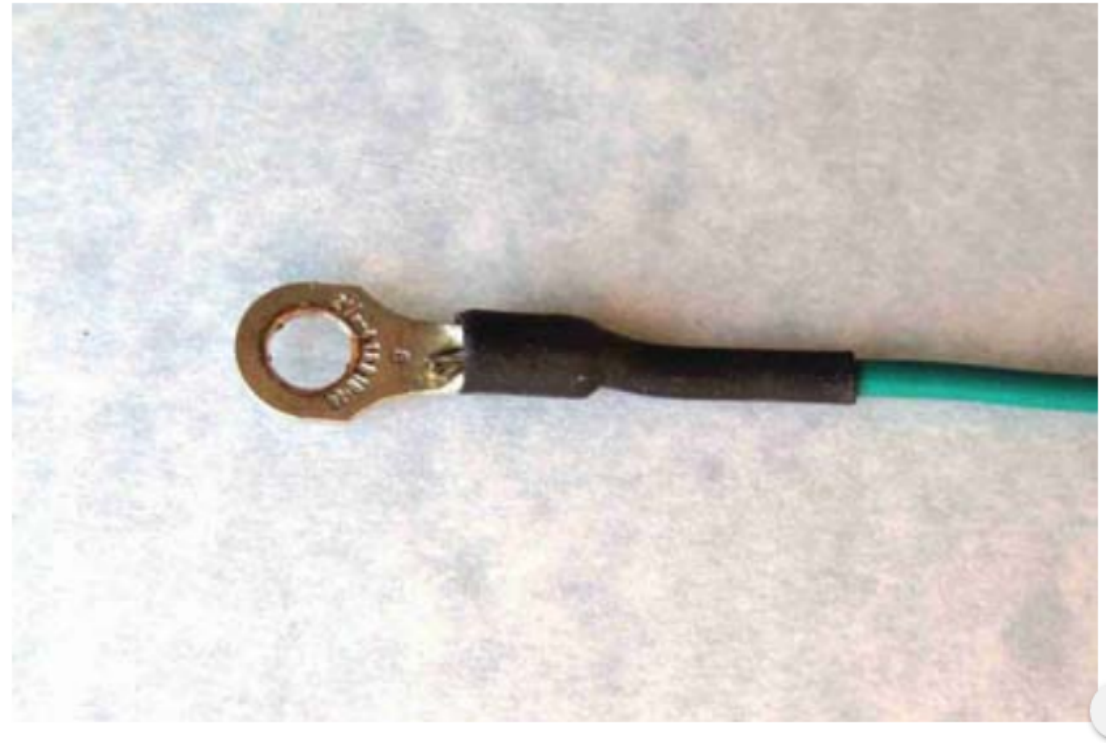


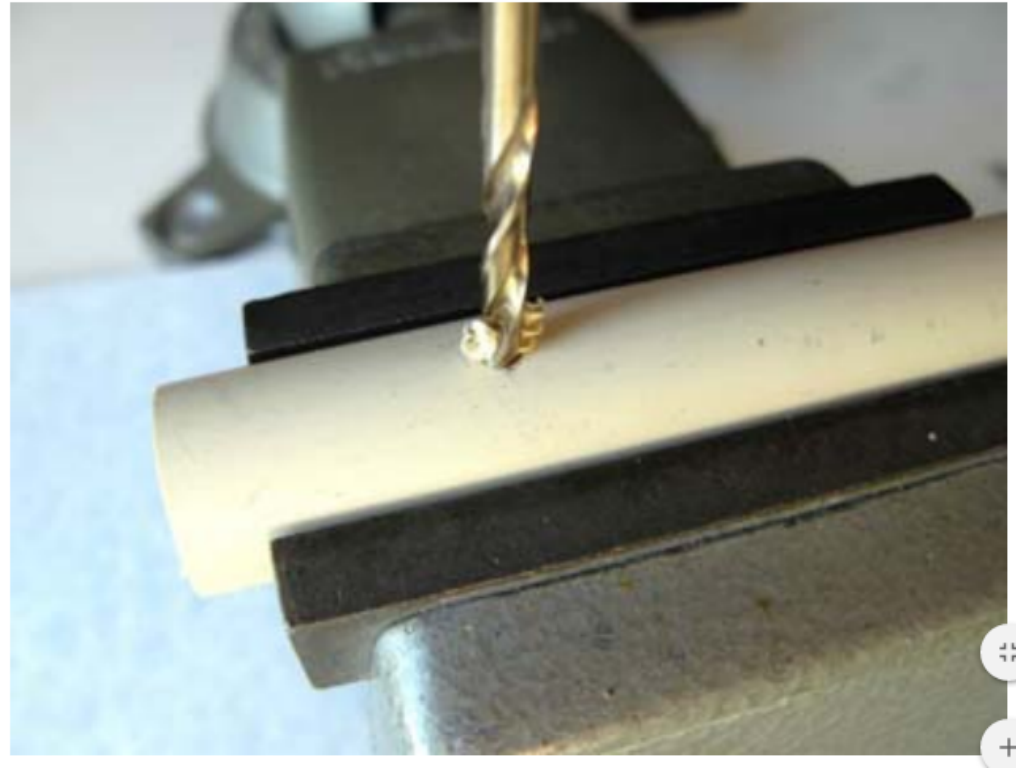
D
GRP
DVM

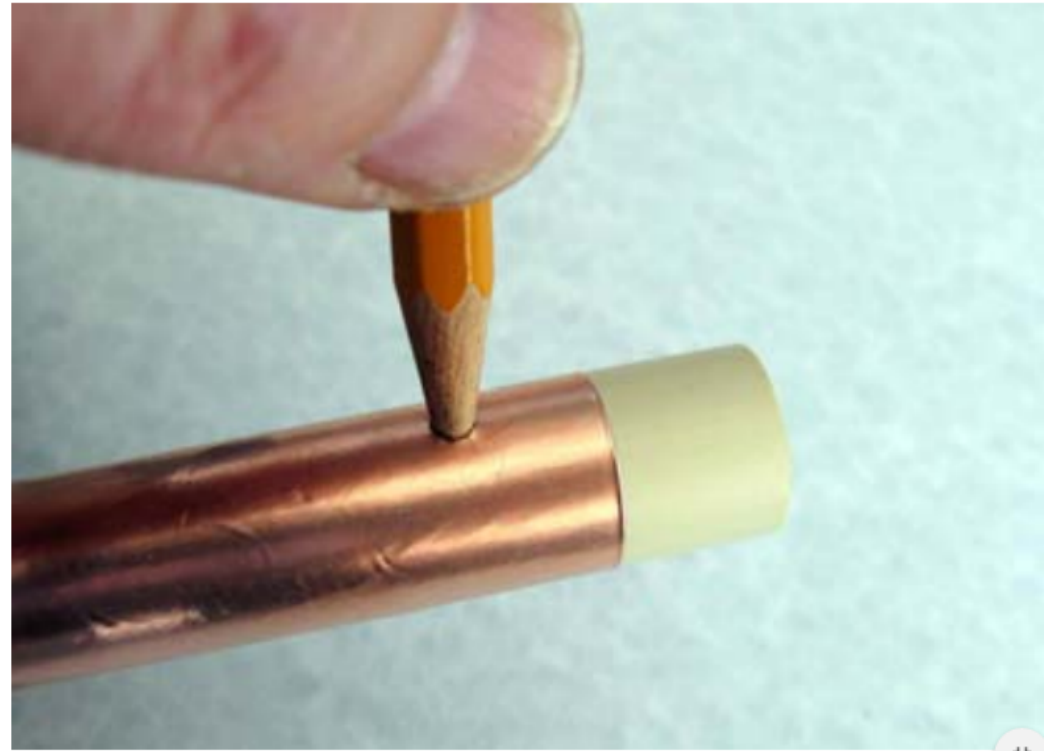
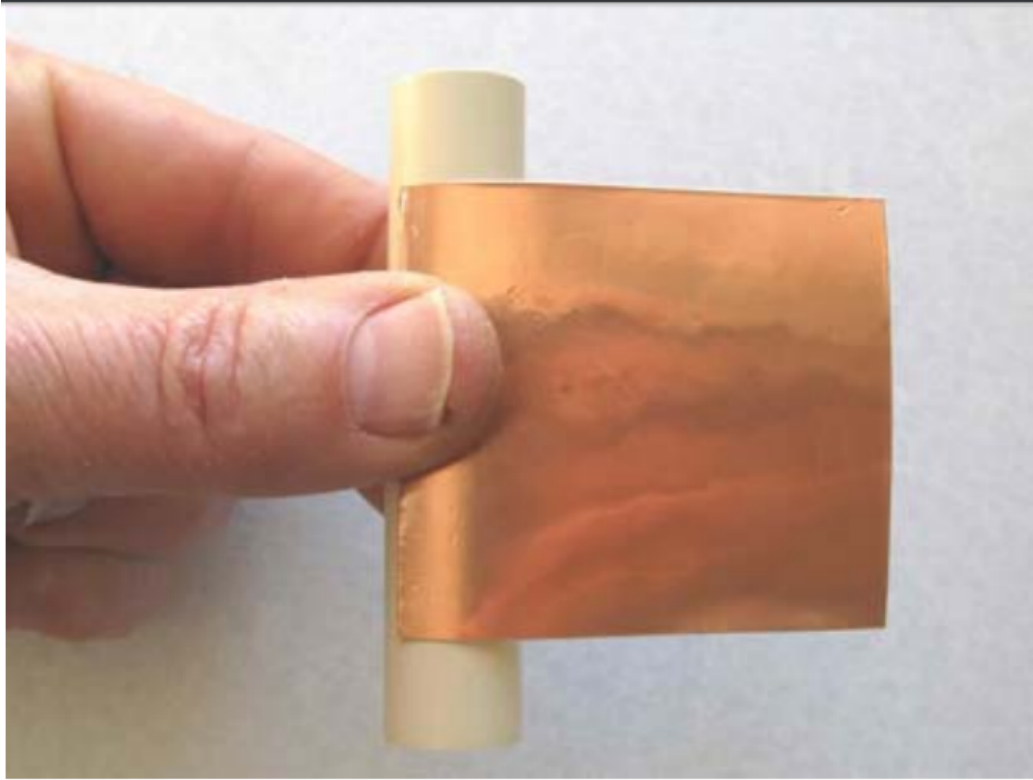


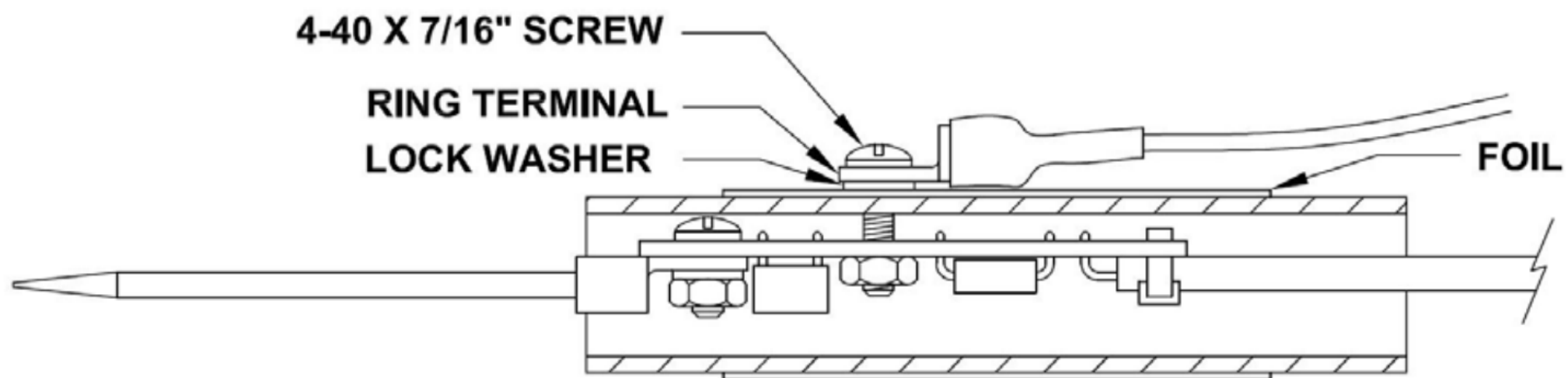


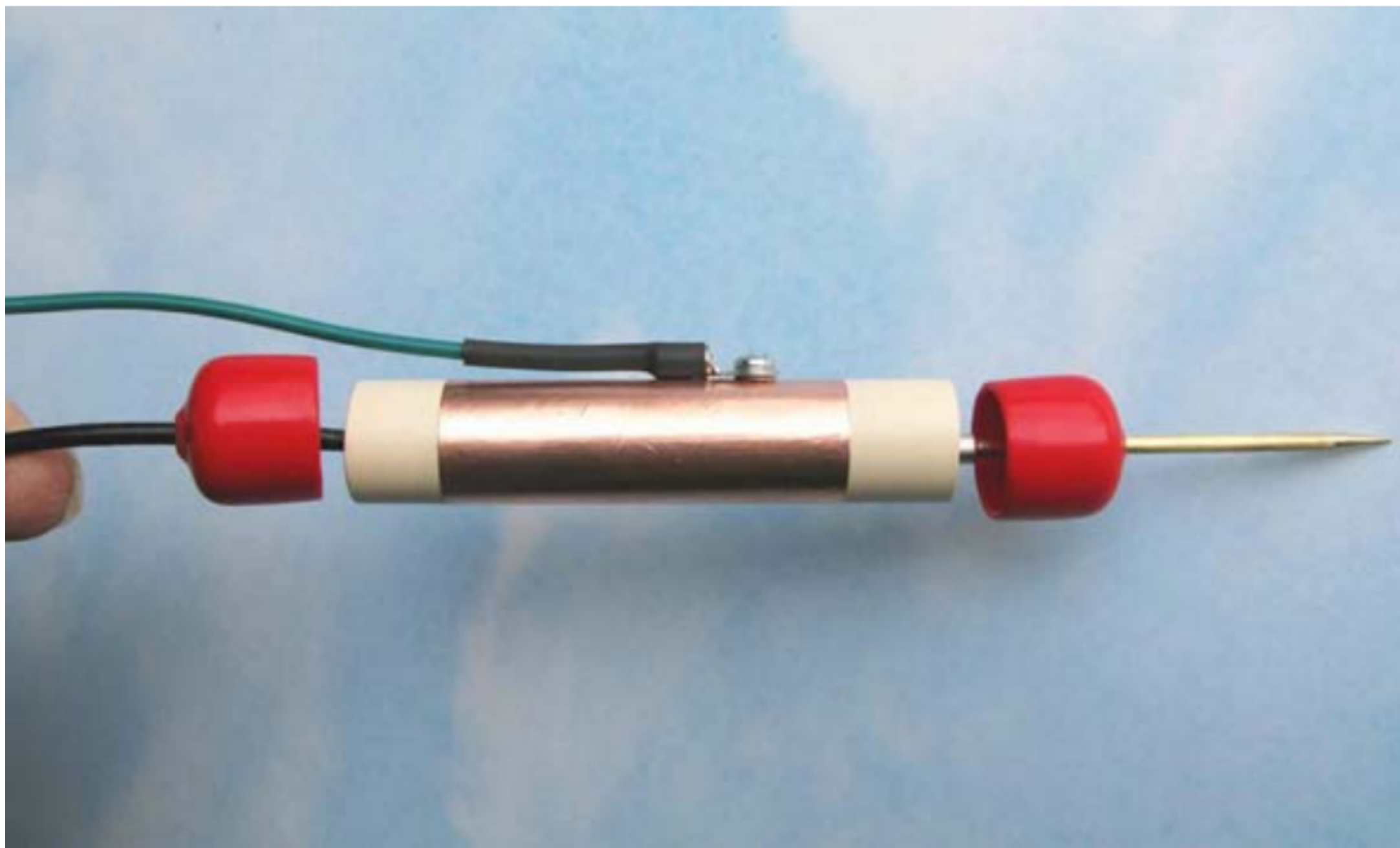


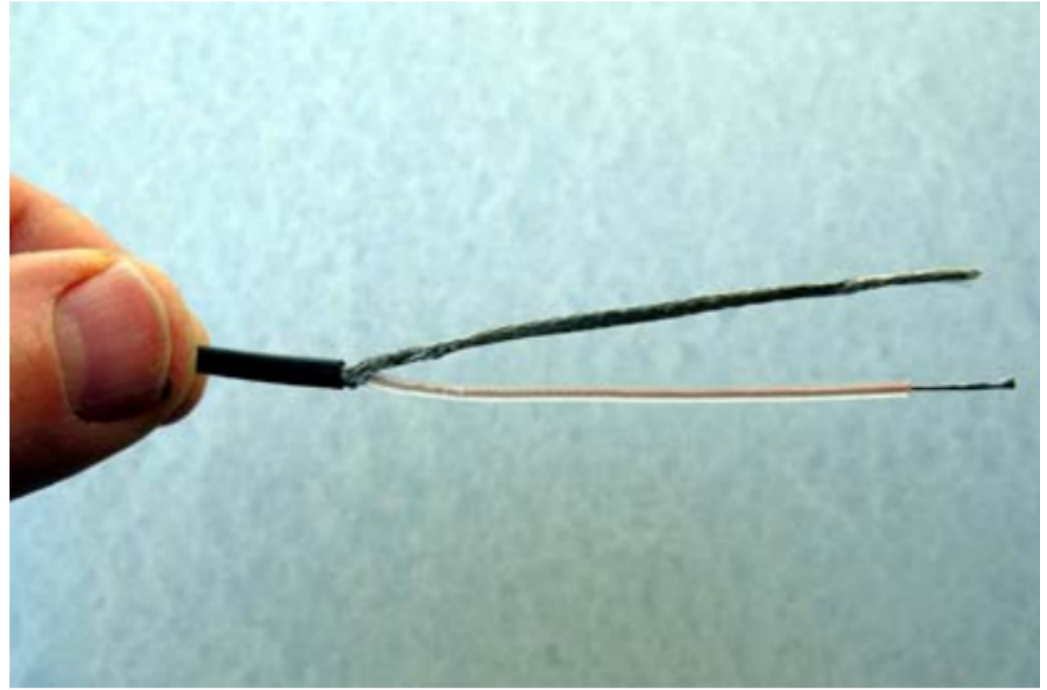
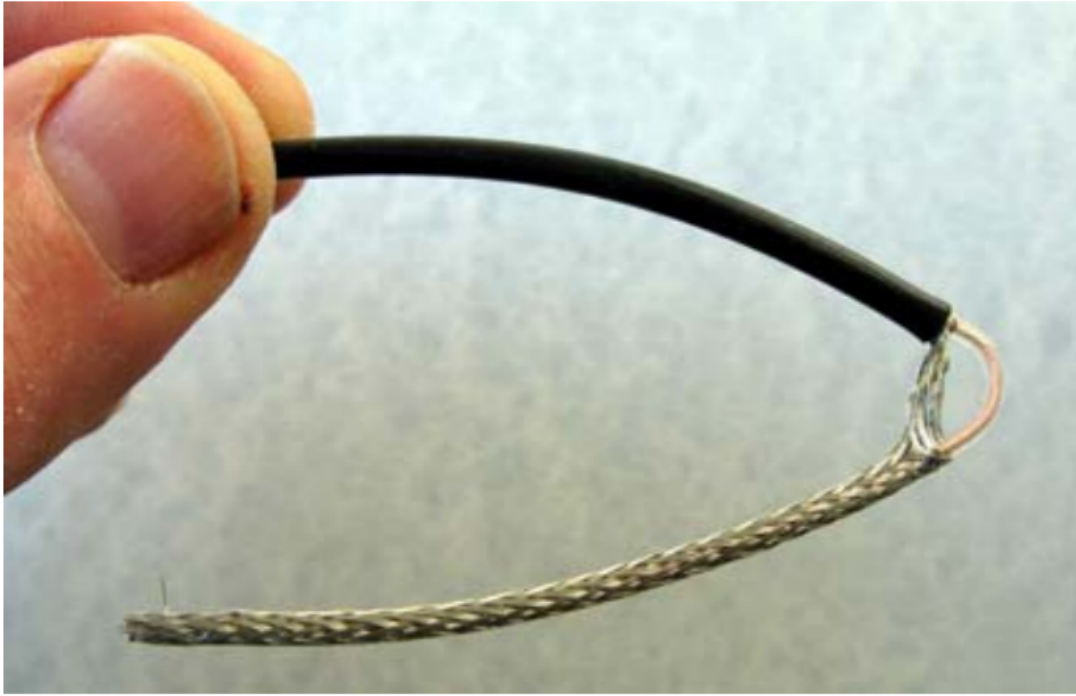


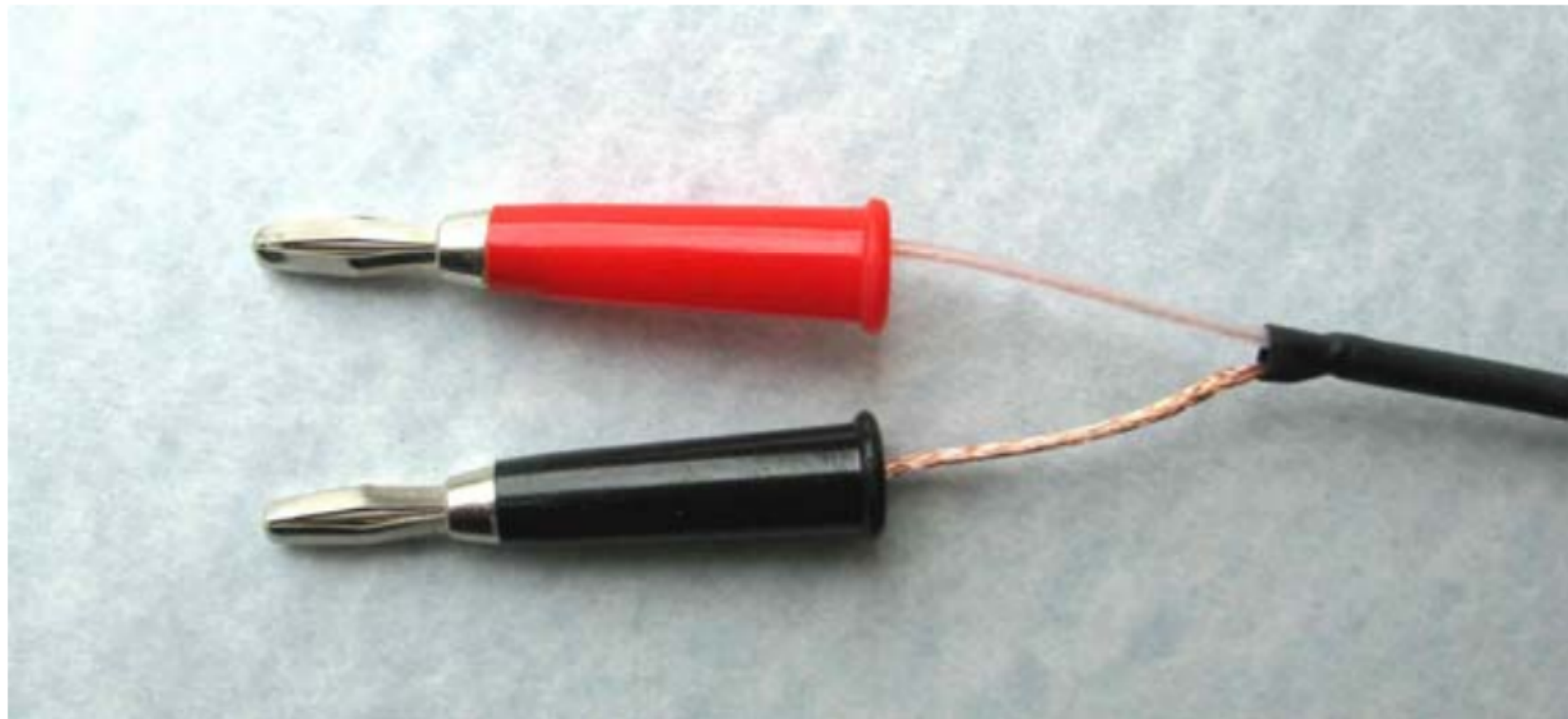


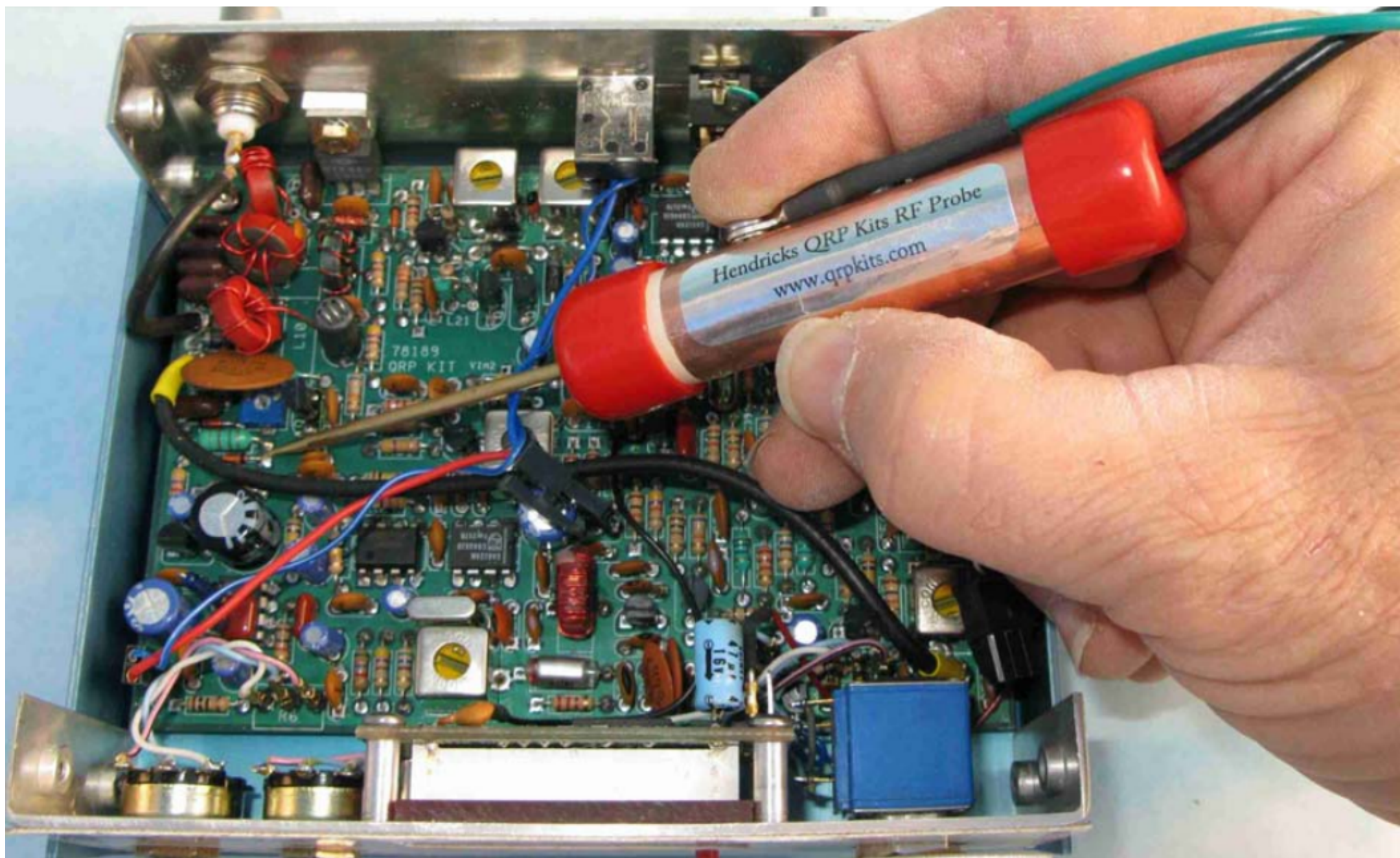




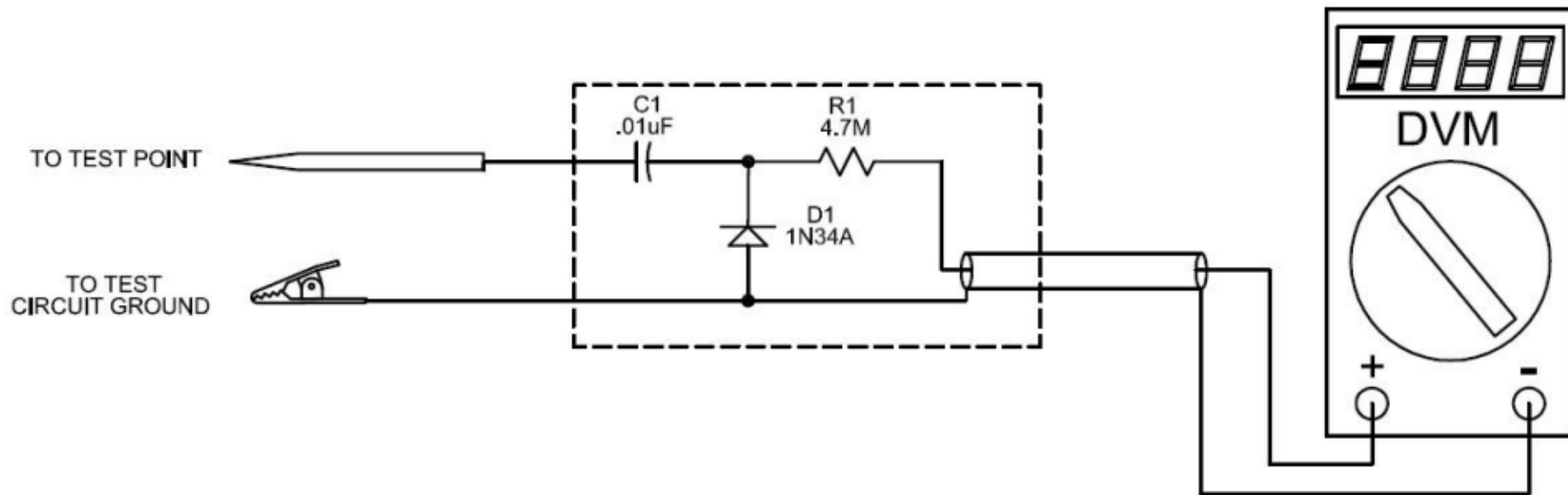






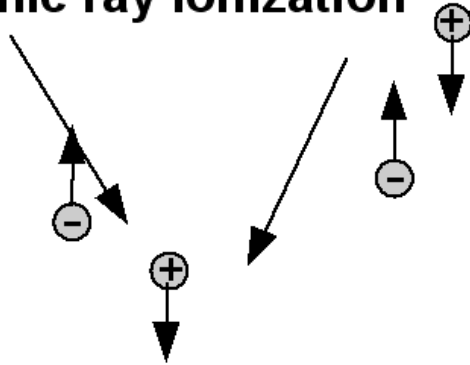


Look in the files section for **Dar's (Darwin Piatt) – W9HZC** application and usage tips for the R.F. Probe.

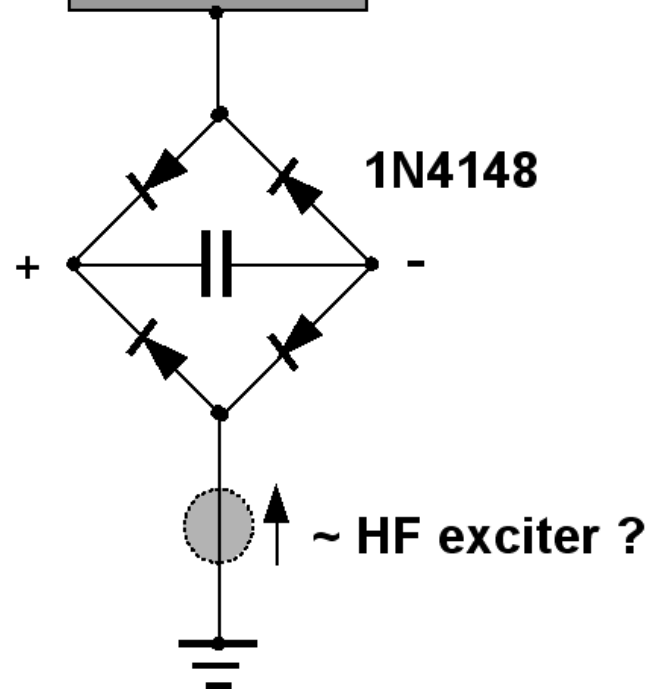


ELECTRIC ENERGY FROM SPACE:

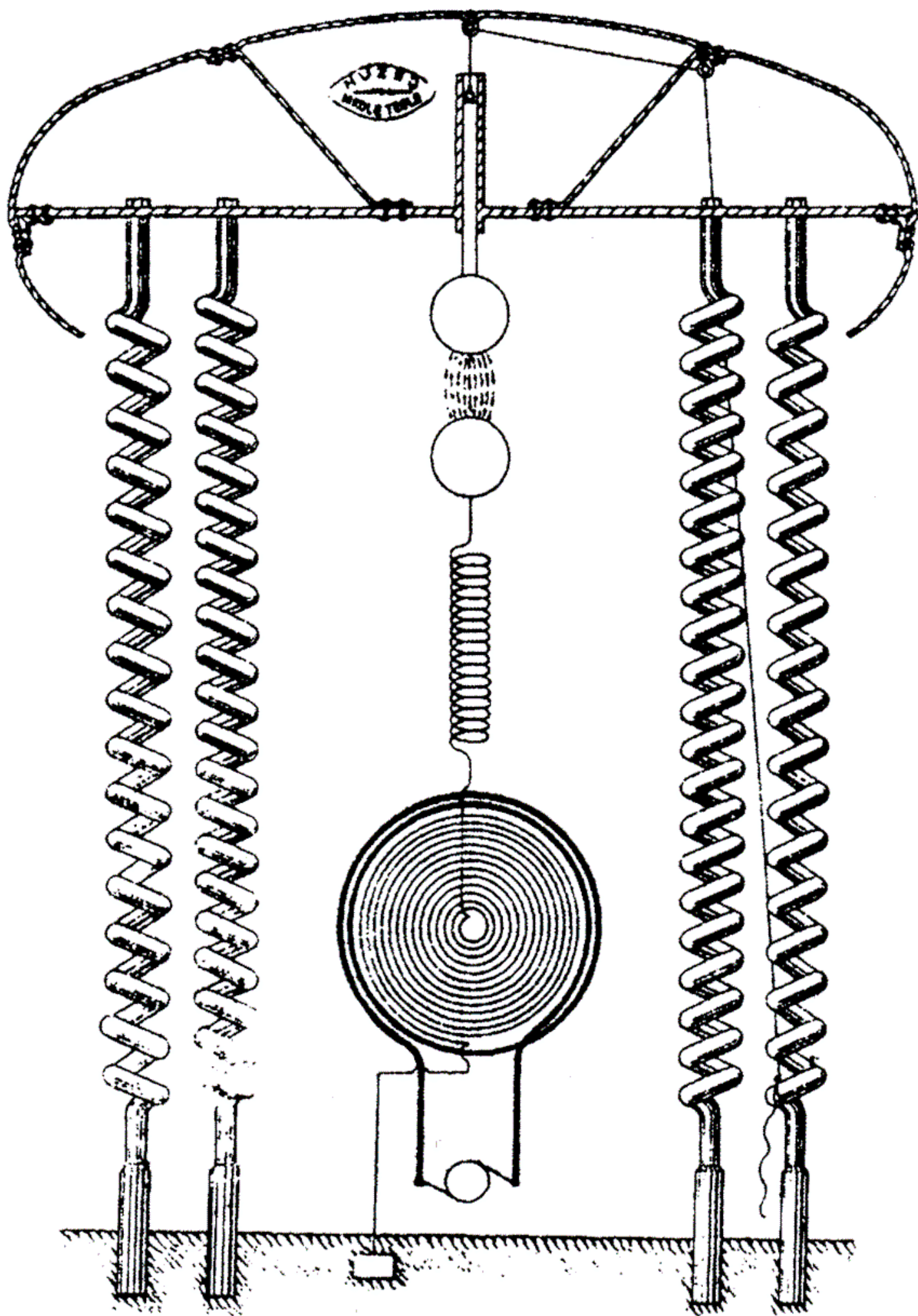
Cosmic ray ionization



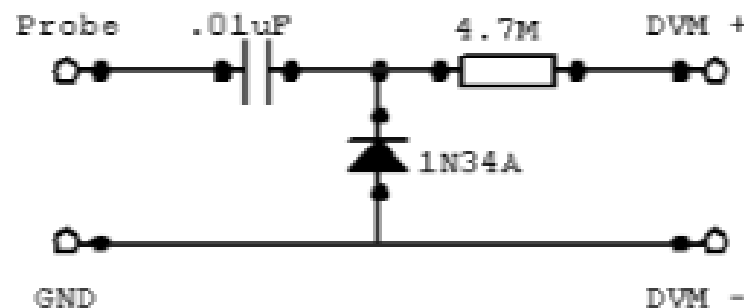
Aluminium plate (foil)



GROUND



RF tip for Multimeter and Oscilloscope



KA8MAV RF PROBE

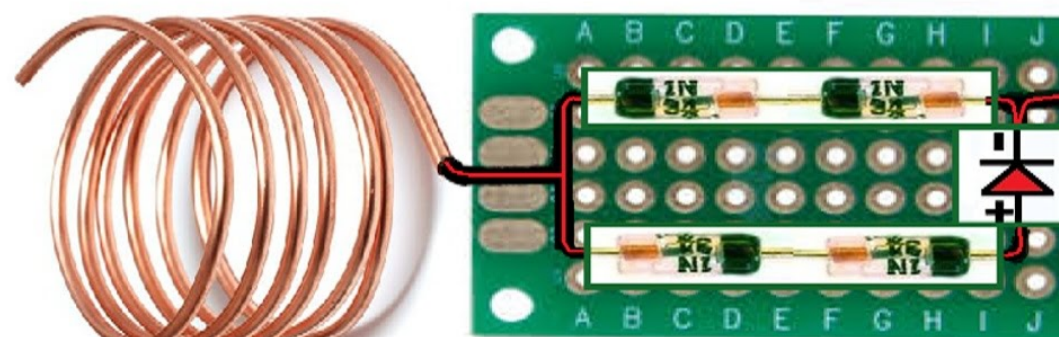
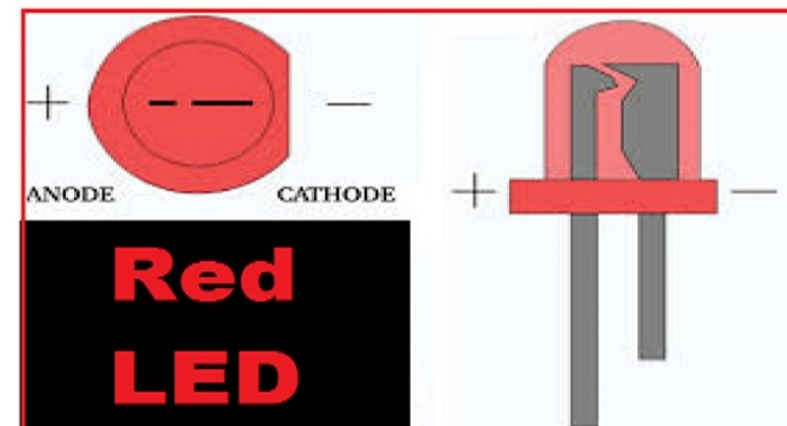
The project **RF tip** is simple, not need special components and there is no great difficulty in its construction, making it ideal for beginners. The creator of this tip was the amateur KA8MAV, hence the name of the tip arose. Above the electronic circuit probe.

List of components for the tip RF

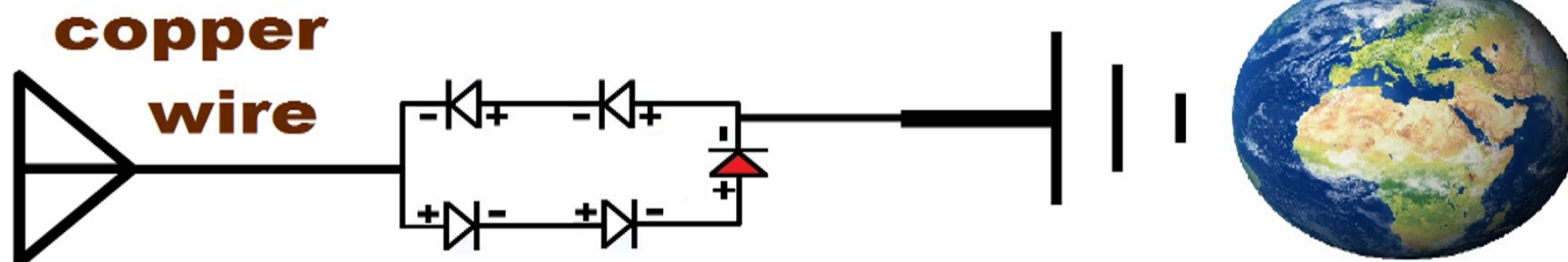
- 1 Germanium diode OA79, 1N34 or equivalent
- 1 Capacitor 0.01uF
- 1 Resistor 4M7 x 1/4 Watts

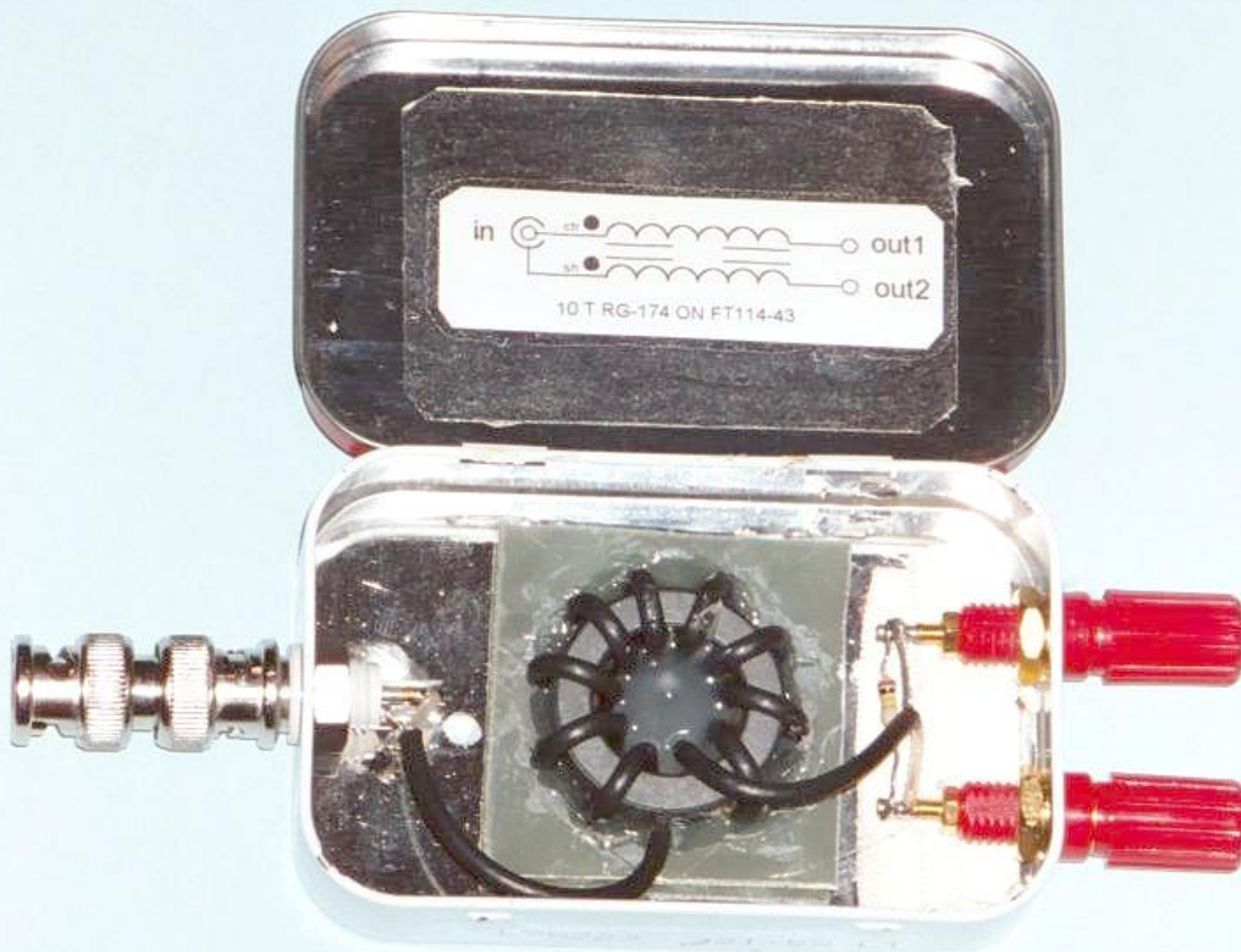


RF Probe by KA8MAV
November 25, 2001

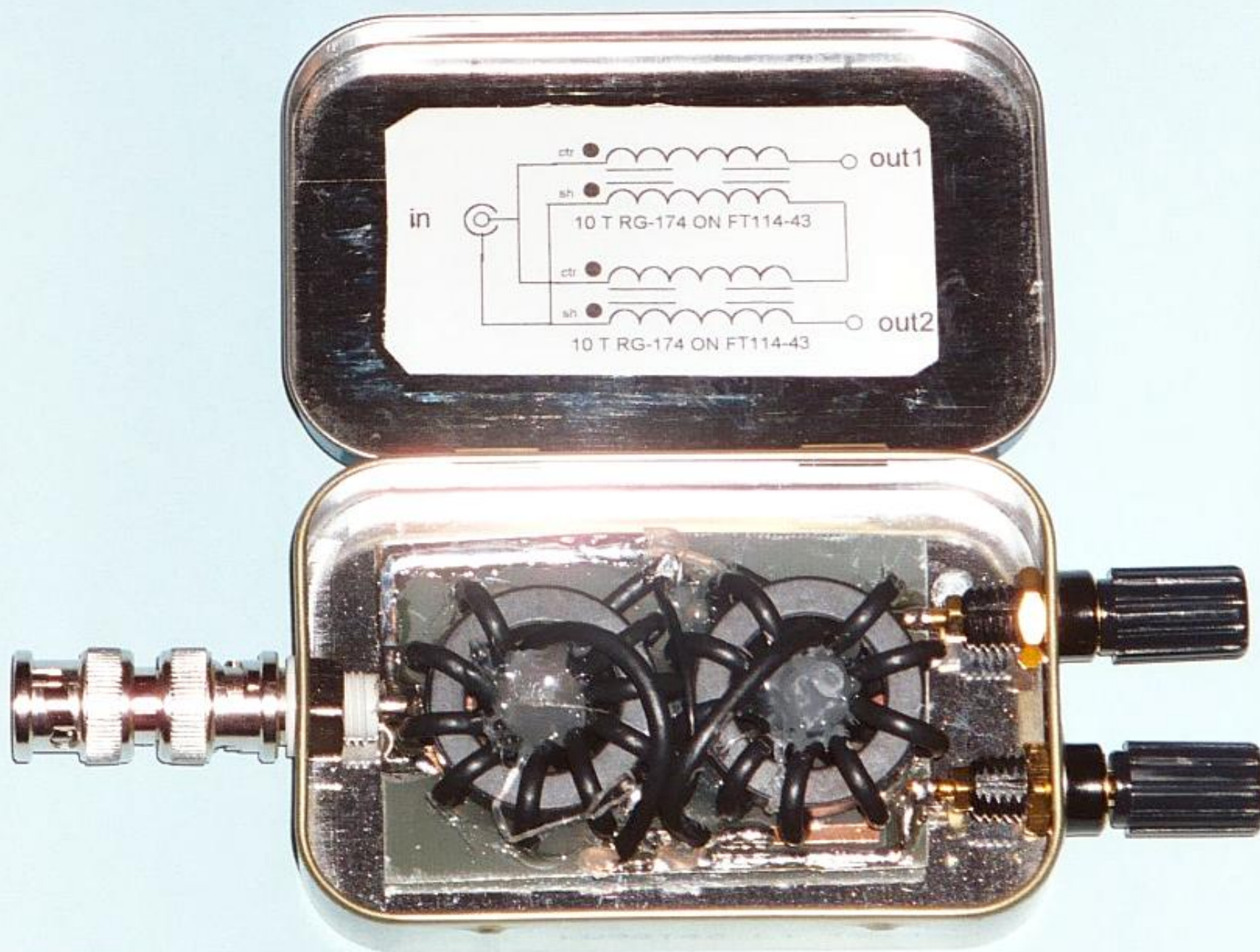


Aluminium Tube



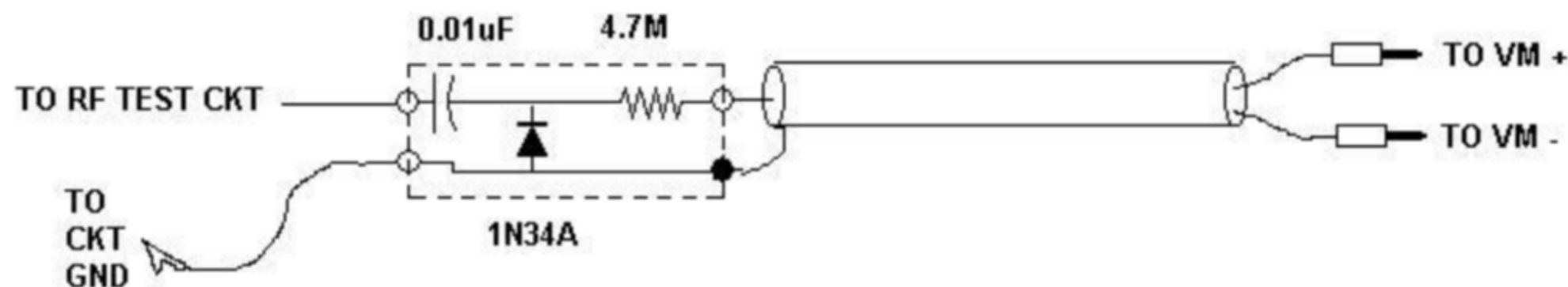


N5FC 2002



N5FC 2002

N5FC 2001



CLASSIC RF PROBE

Reads RMS Equivalent Voltage in test circuit, if Voltmeter is 10 -11 Meg Input Impedance;
Reads 4X RMS Equiv Voltage if VM is 1Meg Input Impedance (Set VM to measure DCV)



BALLPOINT PEN

0.01 μ F/50V CHIP CAPAC

4.7 MEG
RESISTOR

XYL'S
SEWING
NEEDLE

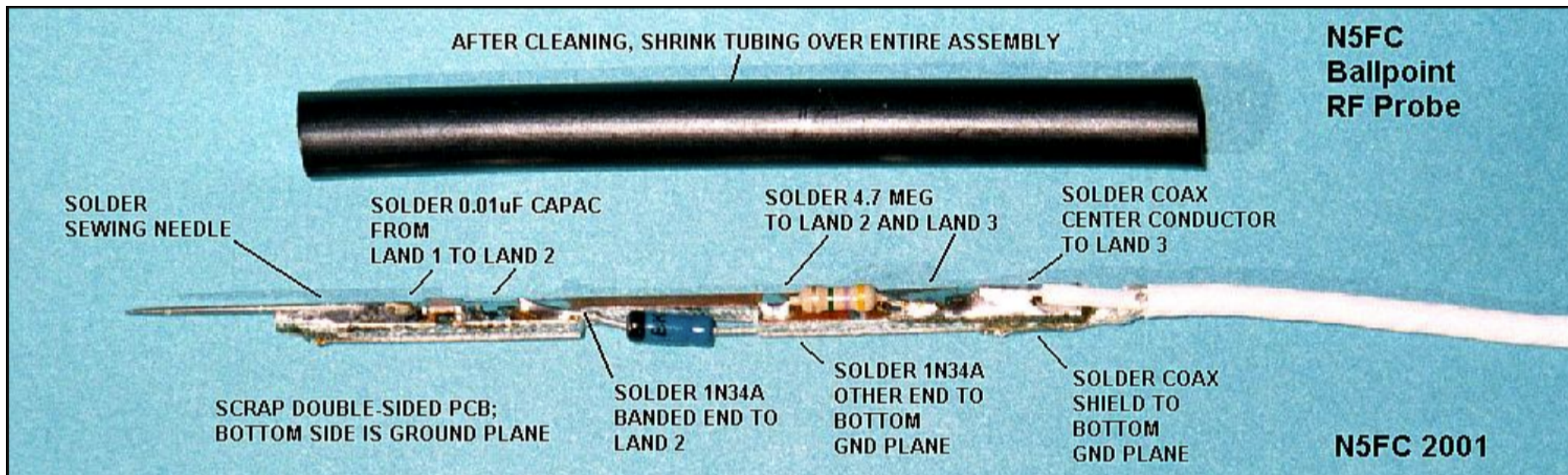
SCRAP
PC BOARD

SET, BANANA
PLUGS RS 274-734

1N34A
Ge DIODE

3-FT HUNK
SHIELDED
CABLE

1. USE DOUBLE-SIDE PCB
2. CUT SCRAP PC BOARD TO 2-1/2" L x 3/16" WIDE; CUT NOTCH ABOUT 1/2" L & 1/16" DP; PUT TWO GROOVES APPROX AS SHOWN (NOT CRITICAL) SO AS TO CREATE 3 LANDS; DO NOT GROOVE BACK SIDE
3. YOU'LL ALSO NEED ABOUT 3" OF 3/16 TO 1/4" HEAT SHRINK TO COVER THE ASSY WHEN DONE & 10" OF COPPER TAPE (AVAILABLE IN HOBBY STORES)



Wrap adhesive-backed copper foil round-and-round to build shield over heat shrink-covered RF probe assembly; check for shorts

When complete, pull assembly back into ballpoint casing, leaving needle sticking out about 1/2 inch.

N5FC Ballpoint RF Probe

Ballpoint Pen Casing
(Tip & ink tube discarded;
but saved screw-on cap
at rear of pen)

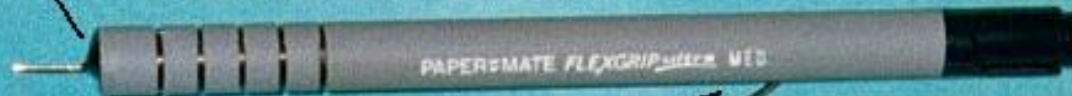
12" Wire pigtail from ground
plane of RF probe PCB solders
to copper taper and continues
back through pen casing
(alongside 3-ft shielded coax)

N5FC 2001

SAVE CAP TO
PROTECT PROBE
AND PEOPLE

CLEAR 5-MINUTE EPOXY HOLDS RF
PROBE ELECTRONICS AND NEEDLE
PERMANENTLY IN PLACE (TEST FIRST!)

WE'VE DRILLED ORIGINAL
BALLPOINT THREADED END
CAP TO PASS COAX THRU



HOLE DRILLED IN
SIDE OF PEN
CASING TO
ACCOMMODATE
12" PIGTAIL

ADD CONVENIENT
GROUND CLIP AT THIS
END OF 12" PIGTAIL

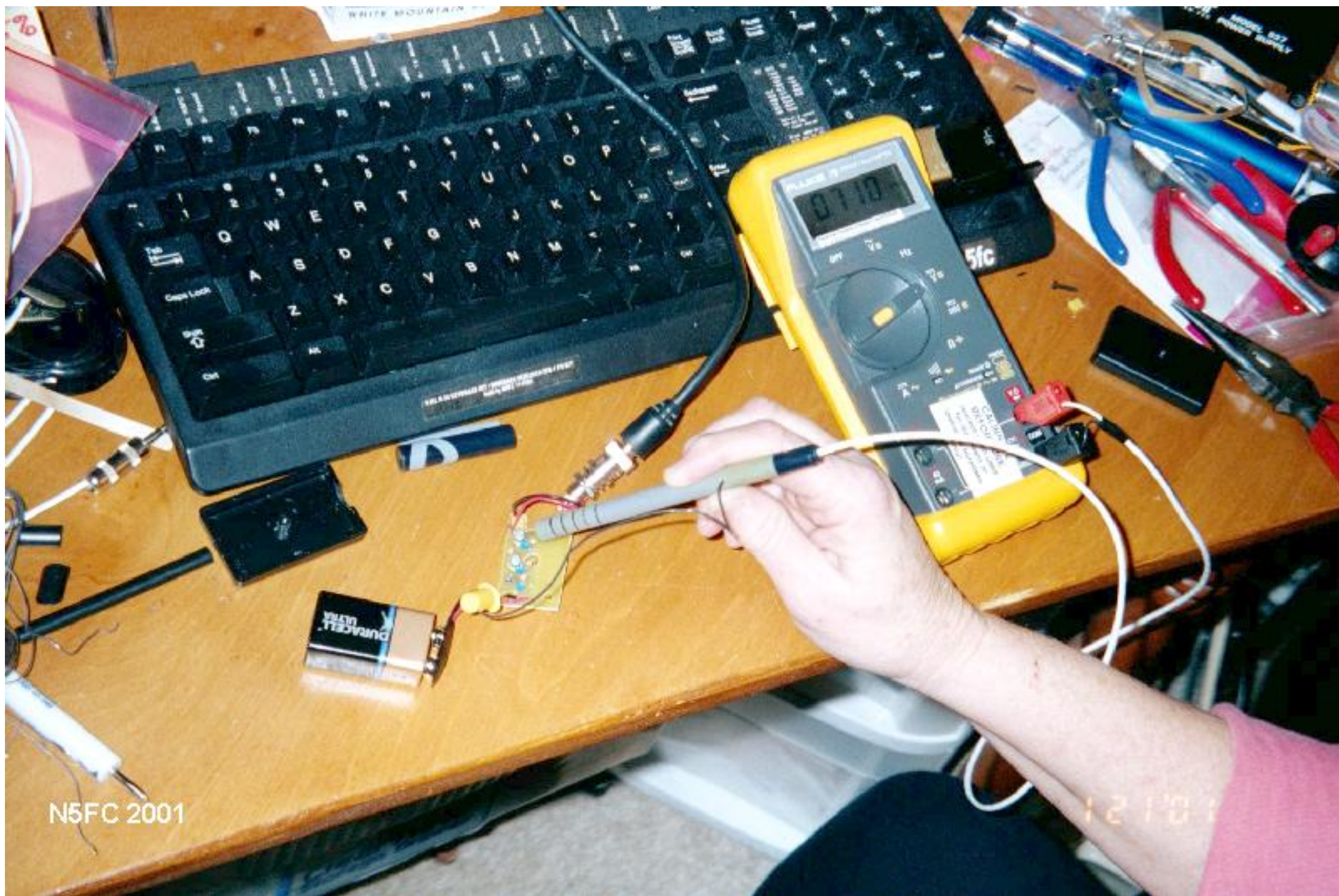
**N5FC
Ballpoint
RF Probe**

SHIELDED CABLE MAY
BE ANY CONVENIENT
LENGTH

ATTACH TWO BANANA
PLUG TO CONNECT TO
DC VOLTMETER



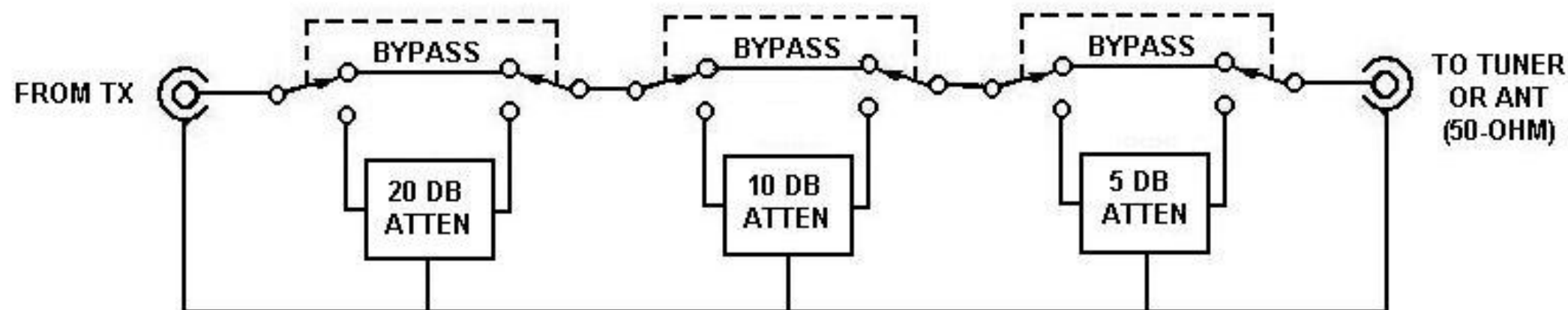
N5FC 2001



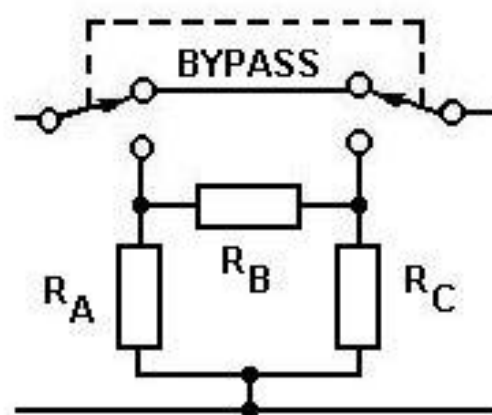
N5FC 2001

N5FC 4-2001



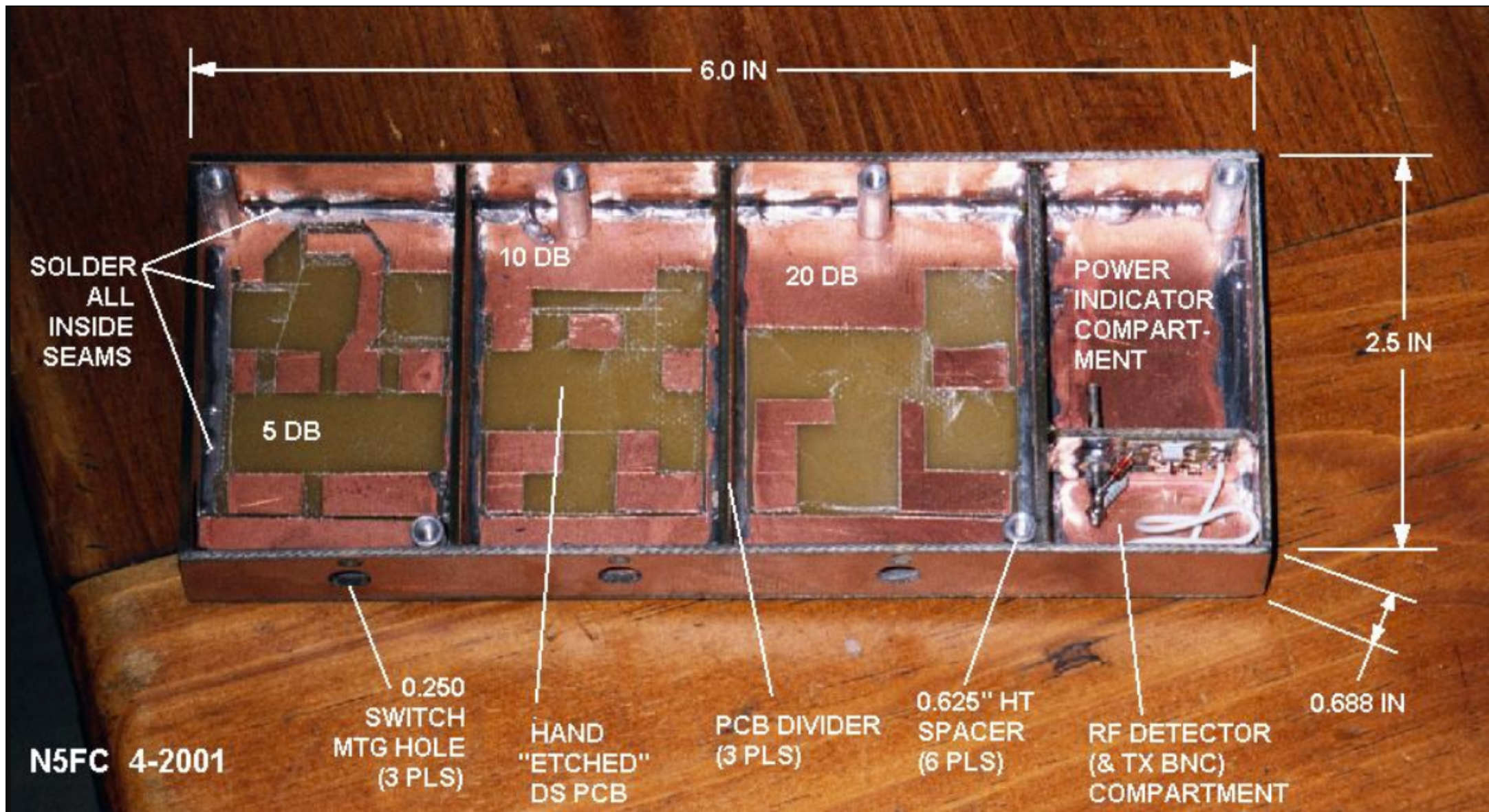


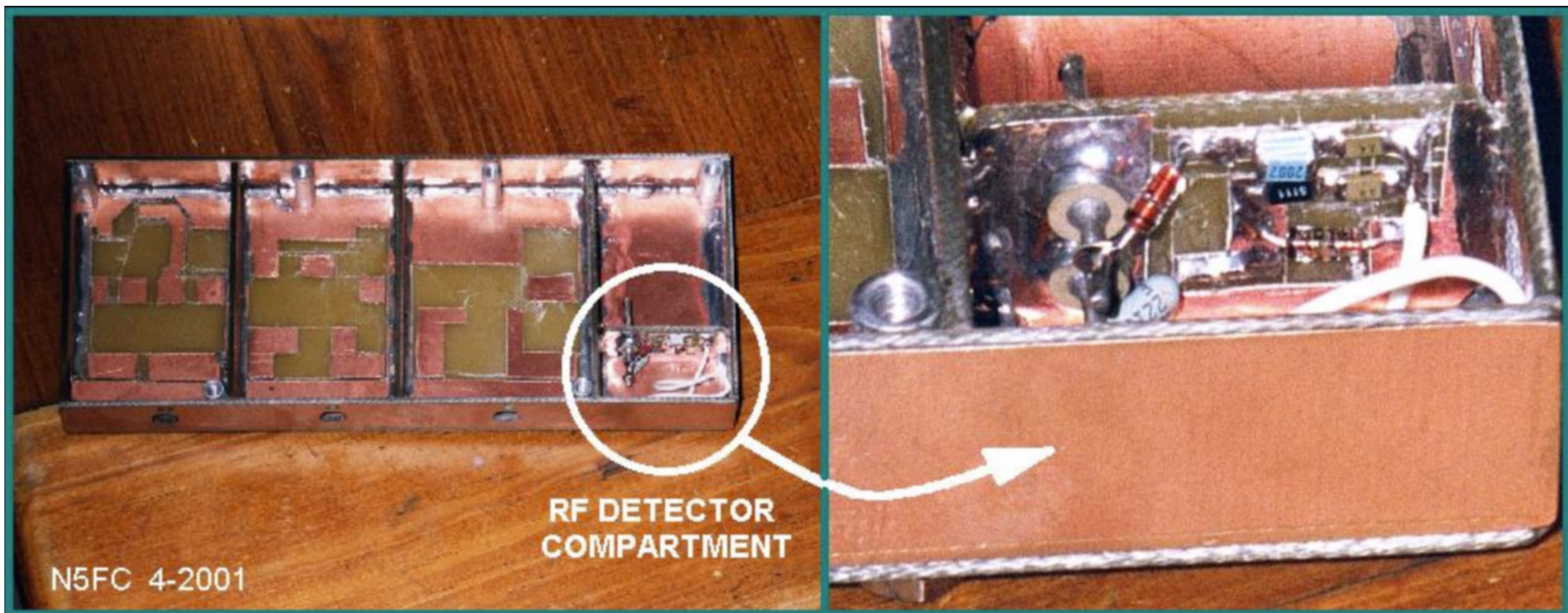
N5FC QRP Switchable 0-5-10-15-20-25-30-35 db Attenuator



**ATTENUATOR
SECTION
CIRCUIT**

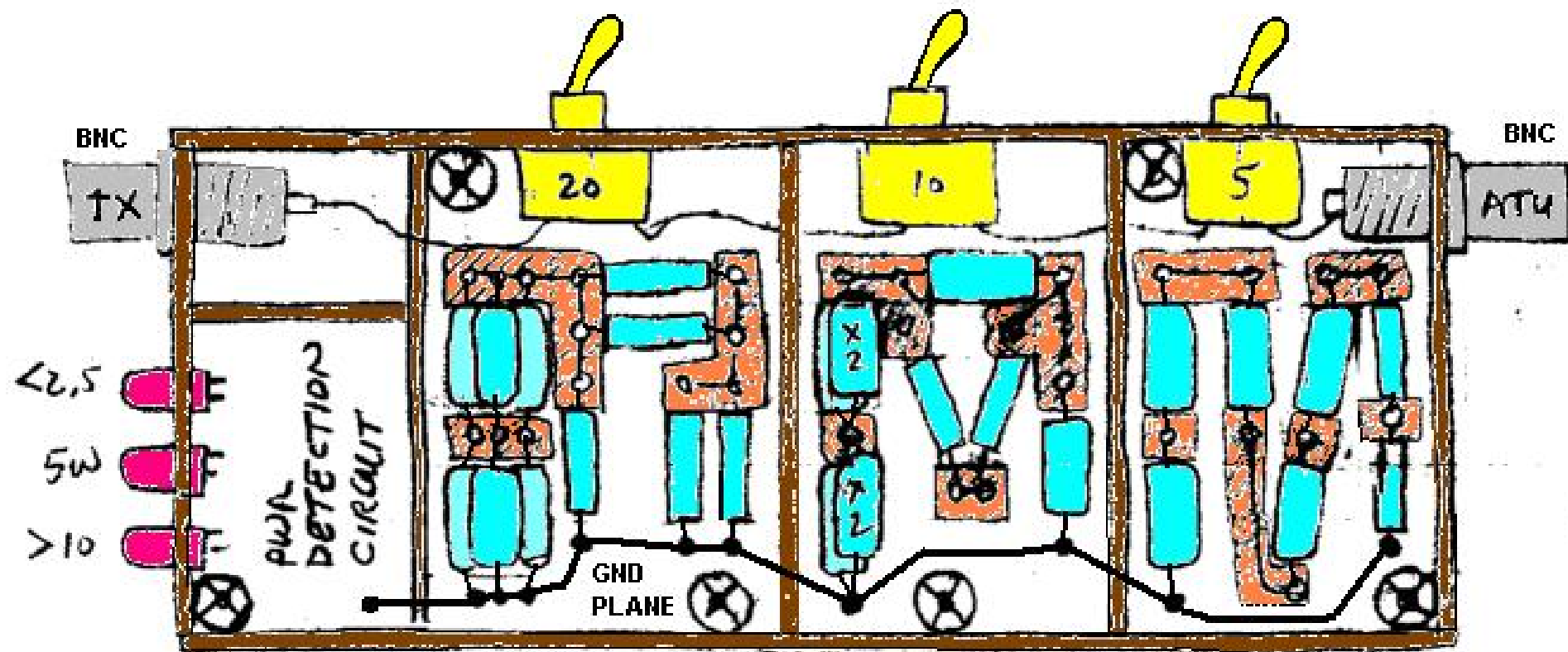
		NOM'L	ACT'L	IMPLEMENT WITH
20 db (NOM) ACT=19.7db	R_A	61.1	67	6 ea 100/1W SERIES-PAR'L & 1K PAR'L
	R_B	247.5	235	2 ea 470 / 0.5W IN PARALLEL
	R_C	61.1	62	68/0.5W IN PAR'L with 680/0.5W
10 db (NOM) ACT = 9.7 db	R_A	96.2	100	4 ea 100/1W in SERIES-PARALLEL
	R_B	71.2	67	100/1W IN PAR'L w: 2 ea 100/.5W IN SER
	R_C	96.2	100	100/0.5W
5 db (NOM) ACT = 4.9 db	R_A	247.5	200	2 ea 100/1W IN SERIES
	R_B	30.4	30	3 ea 10/1W IN SERIES
	R_C	247.5	200	2 ea 100/0.5W IN SERIES



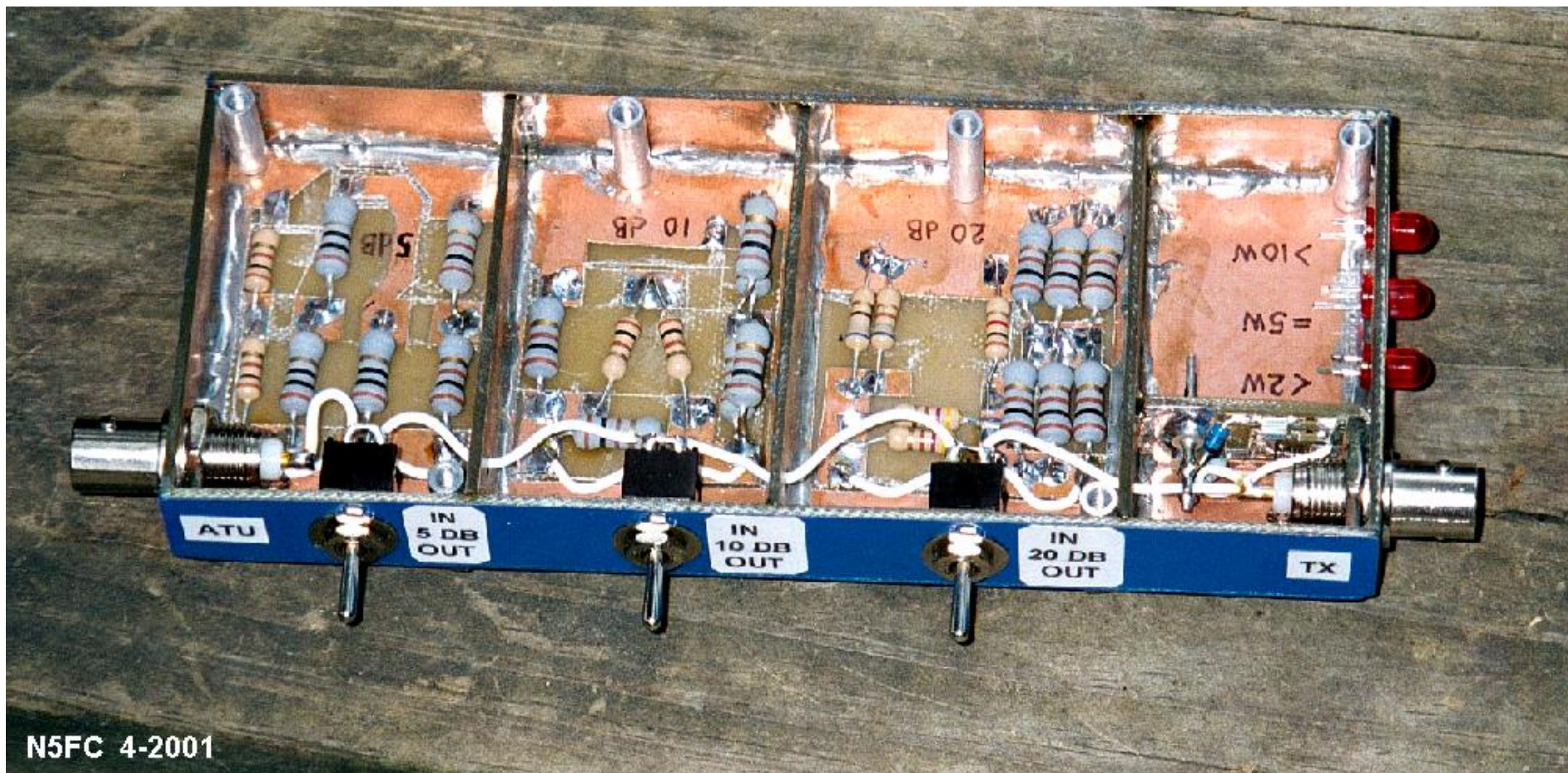


RF DETECTOR
COMPARTMENT

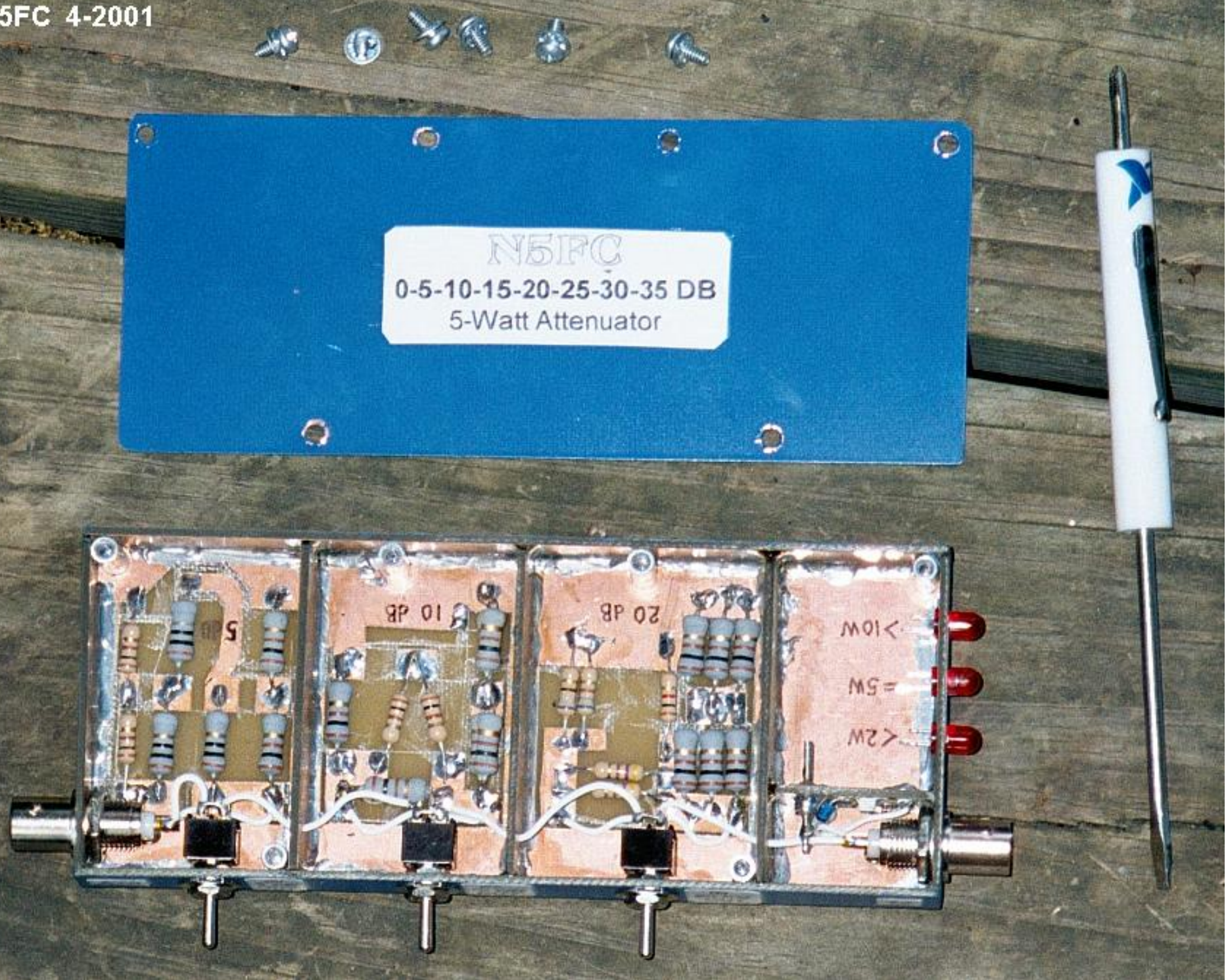
N5FC 4-2001

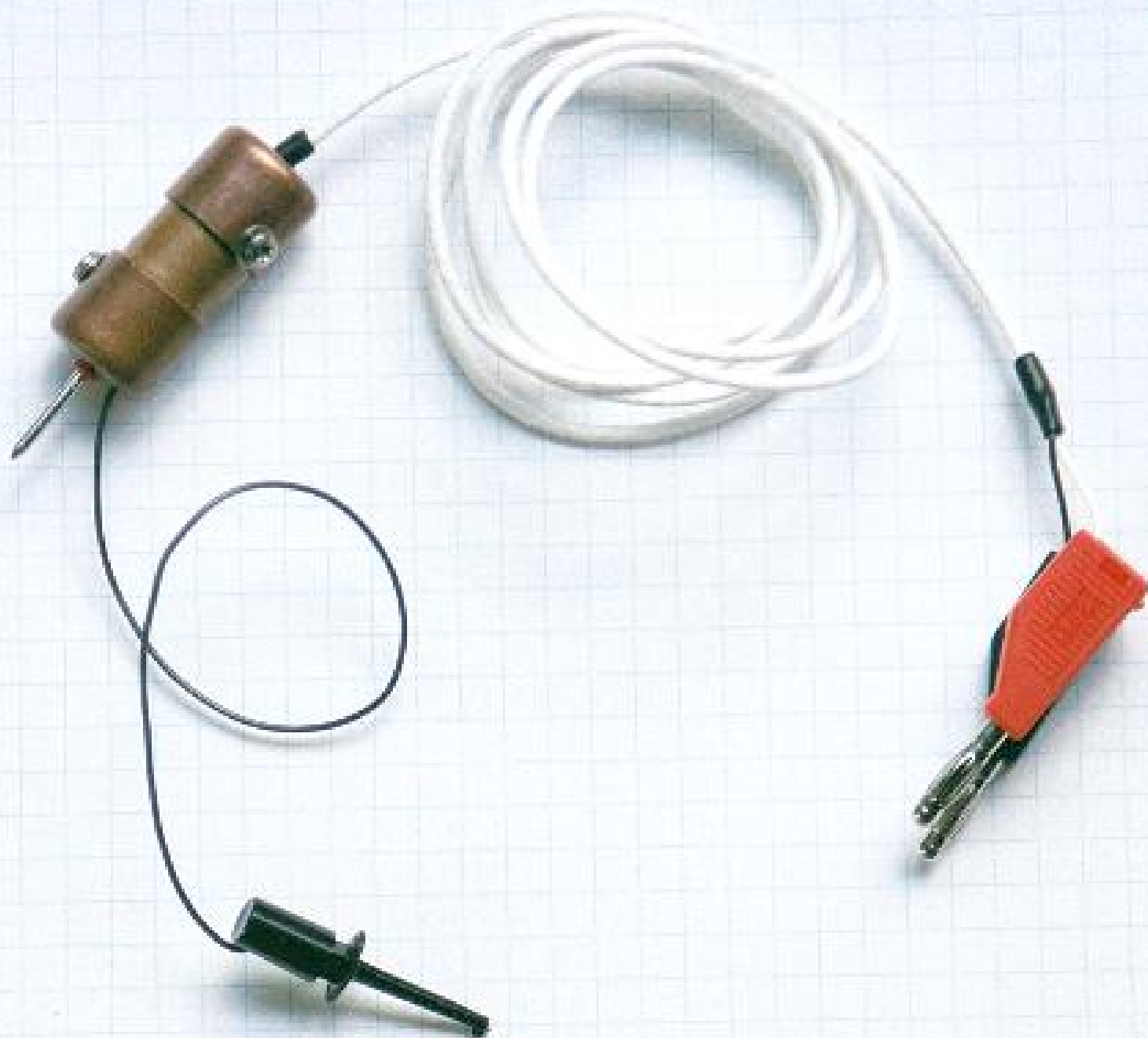


N5FC 4-2001



N5FC 4-2001

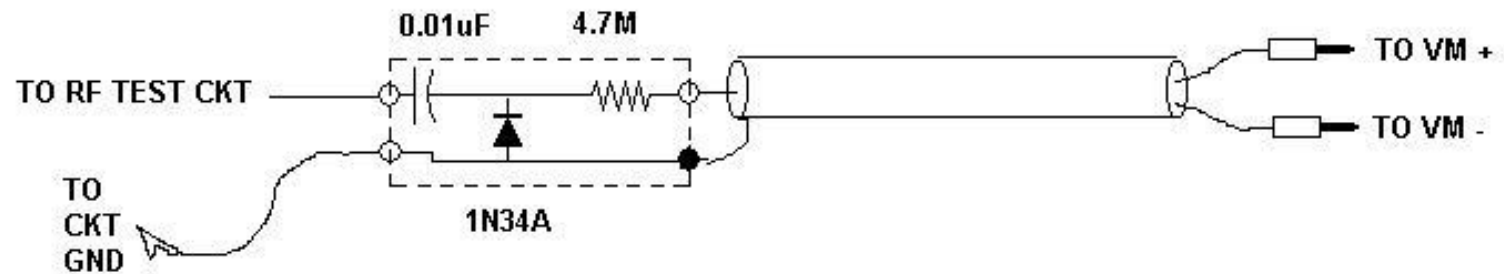




N5FC 2000

asic RF Probe. Simple, eh?

N5FC 2001



CLASSIC RF PROBE

Reads RMS Equivalent Voltage in test circuit, if Voltmeter is 10 -11 Meg Input Impedance;
Reads 4X RMS Equiv Voltage if VM is 1Meg Input Impedance (Set VM to measure DCV)

oretical discussion that we'll make short note of. Obviously, for "probing" we need a "probe". (Hey! No wonder I get paid the big bucks...). We add a SHC
probe goes to our test circuit, where we're probing. Brilliant! We don't want either of these to be long leads, because we're talking RF here, and long leads =

(TOP SIDE)

RF
PROBE
TIP



RF DET
OUT

↓
 $\frac{1}{2}$ "
↑

GND PLANE

GND

(BACK)

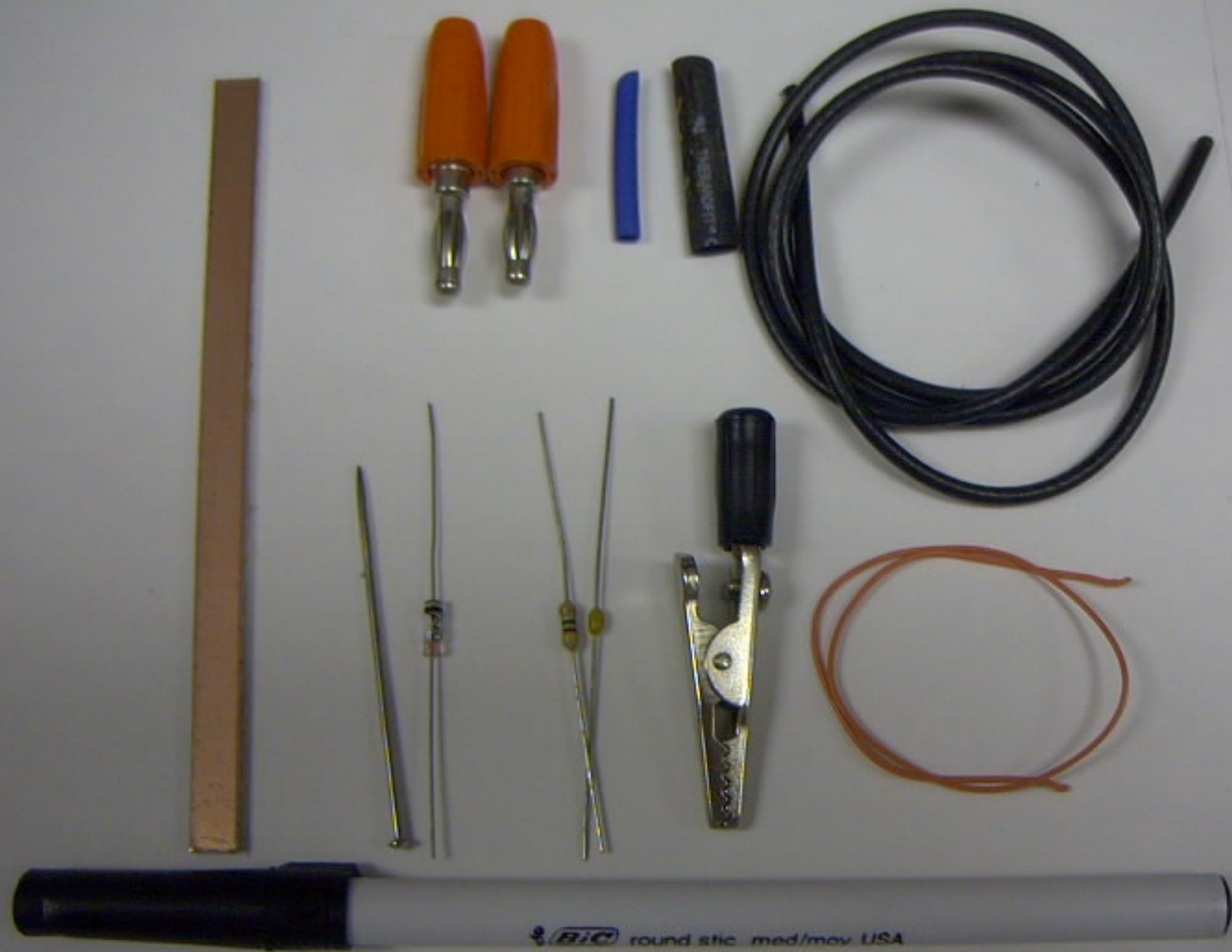
← 1.5" →



GND
CLIP

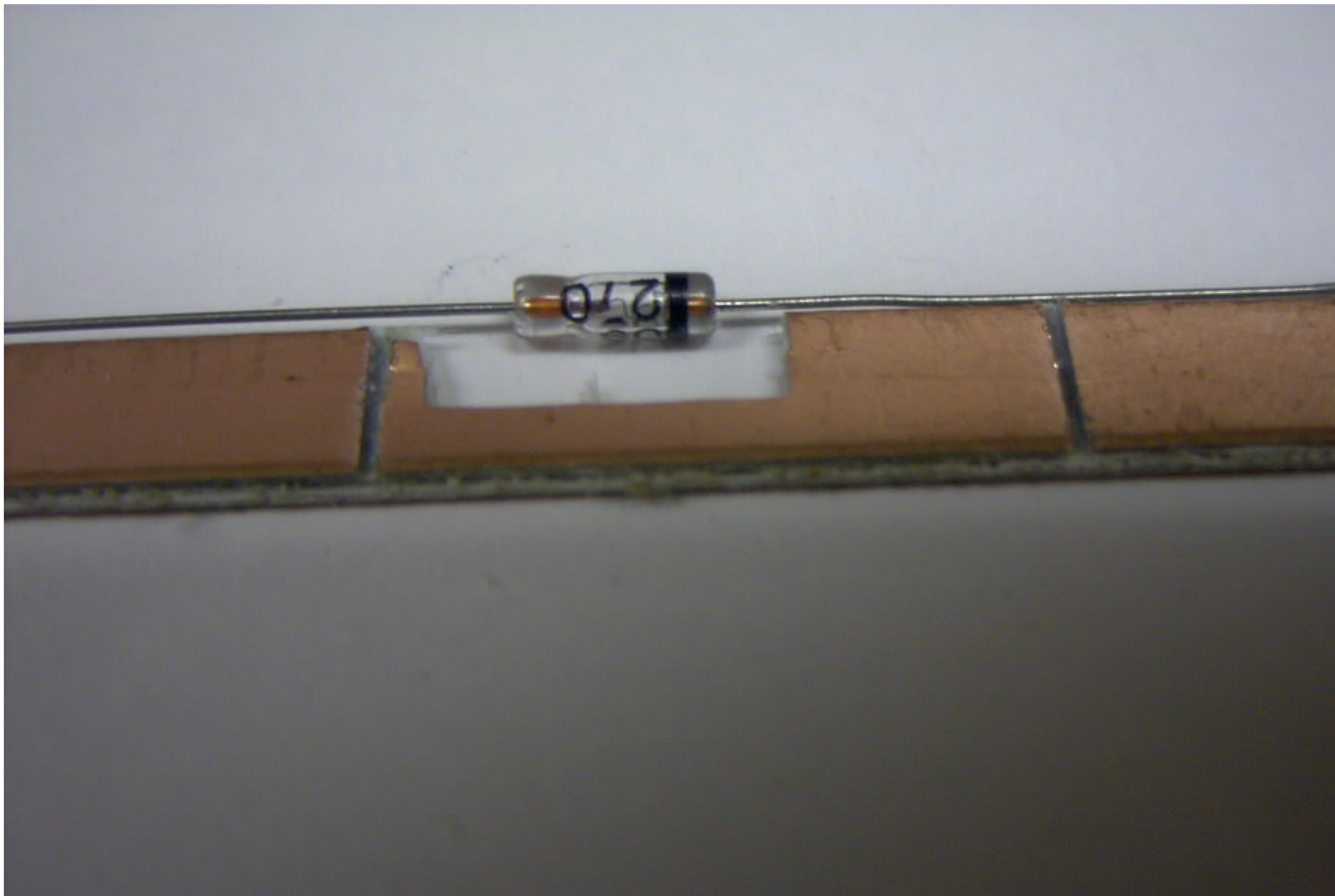


N5FC 2000

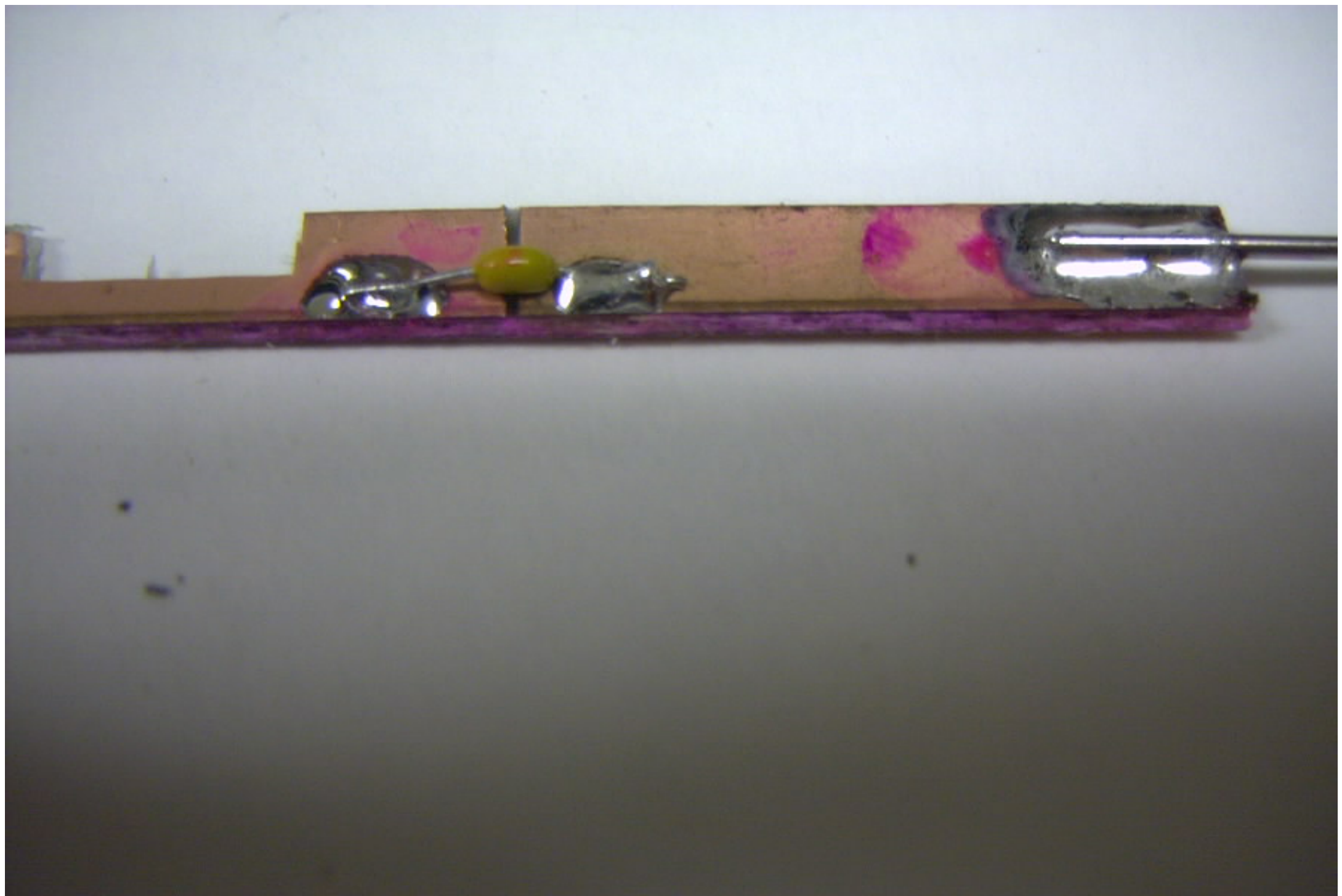


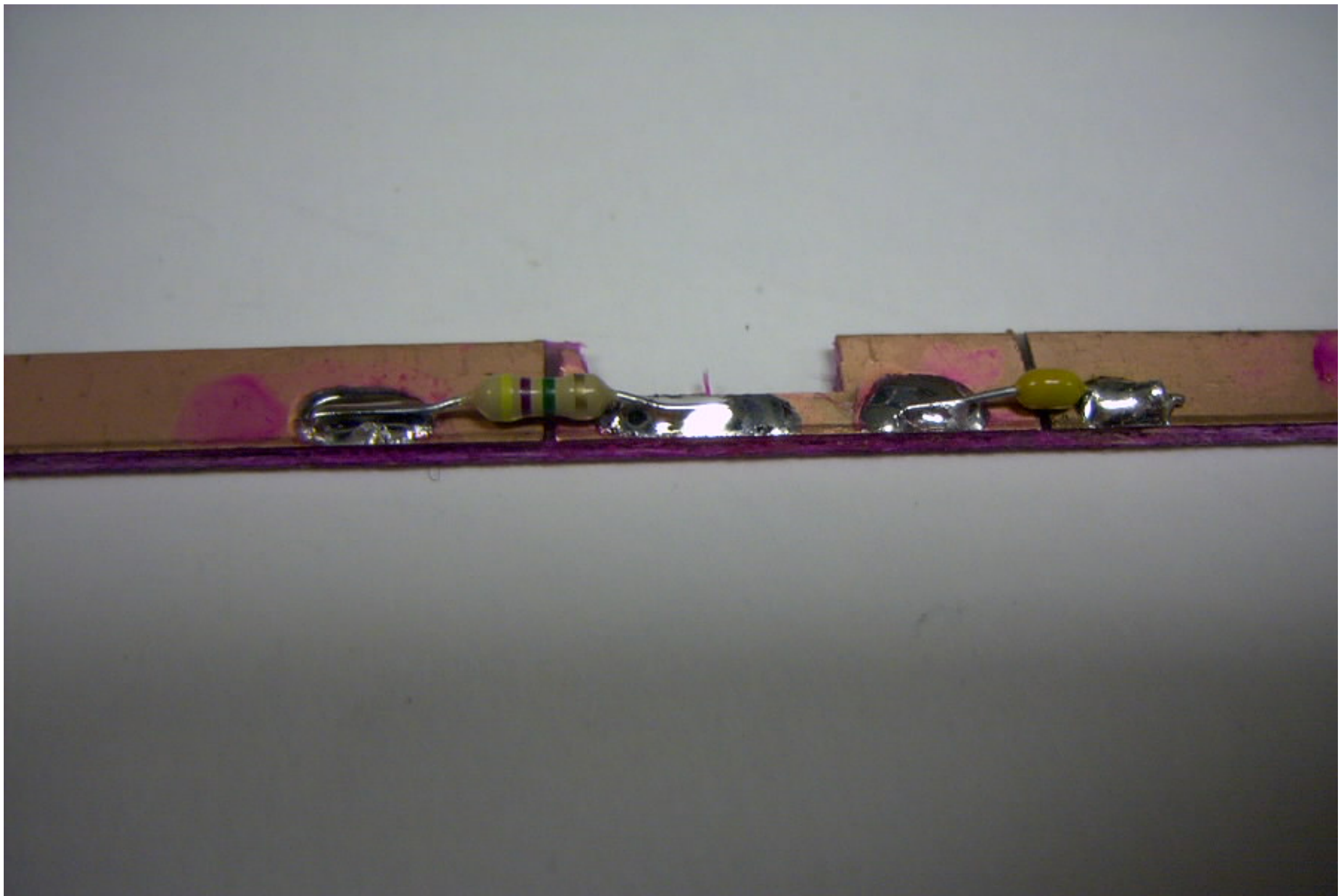




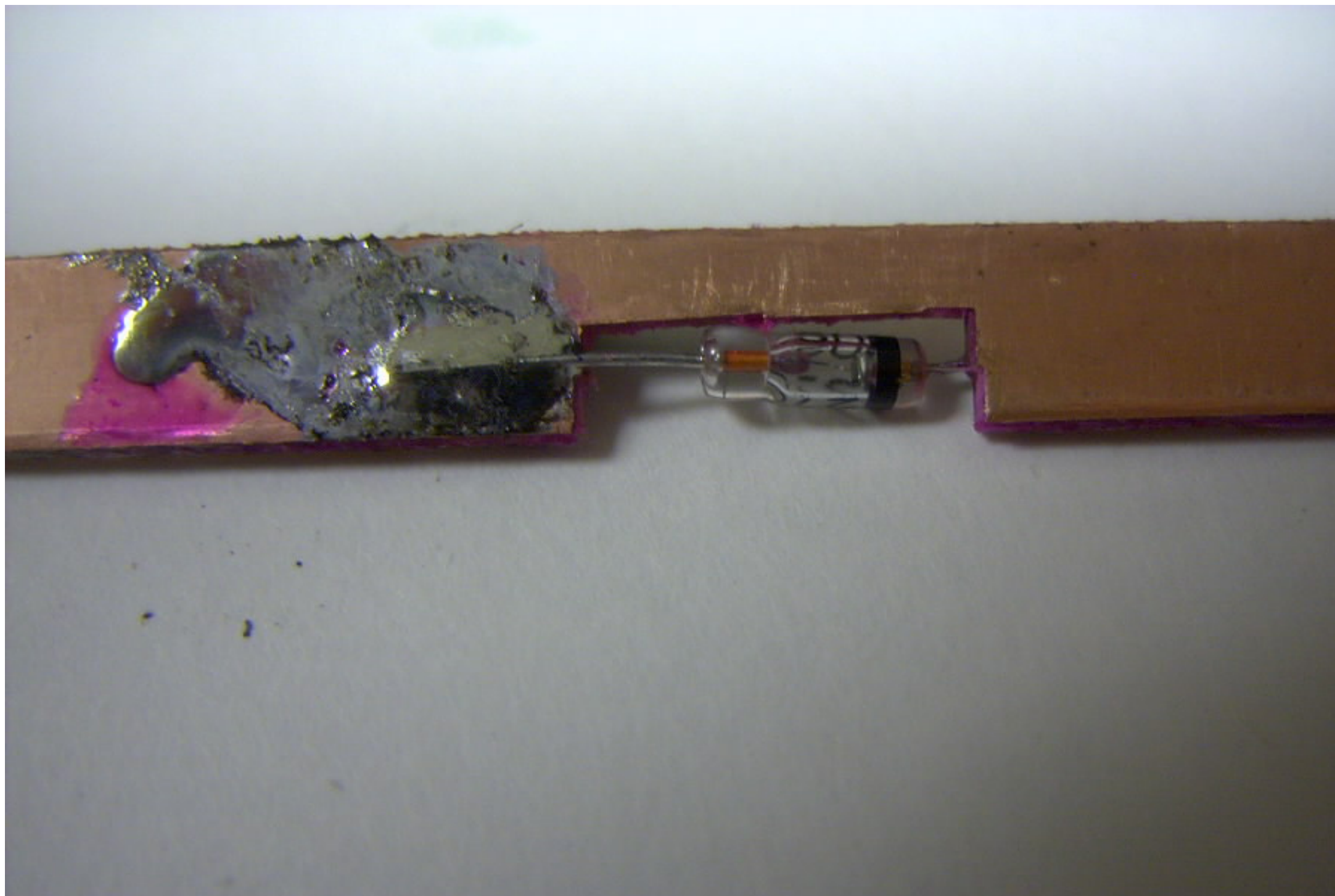






















How to Build Your Own Oscilloscope
Probes

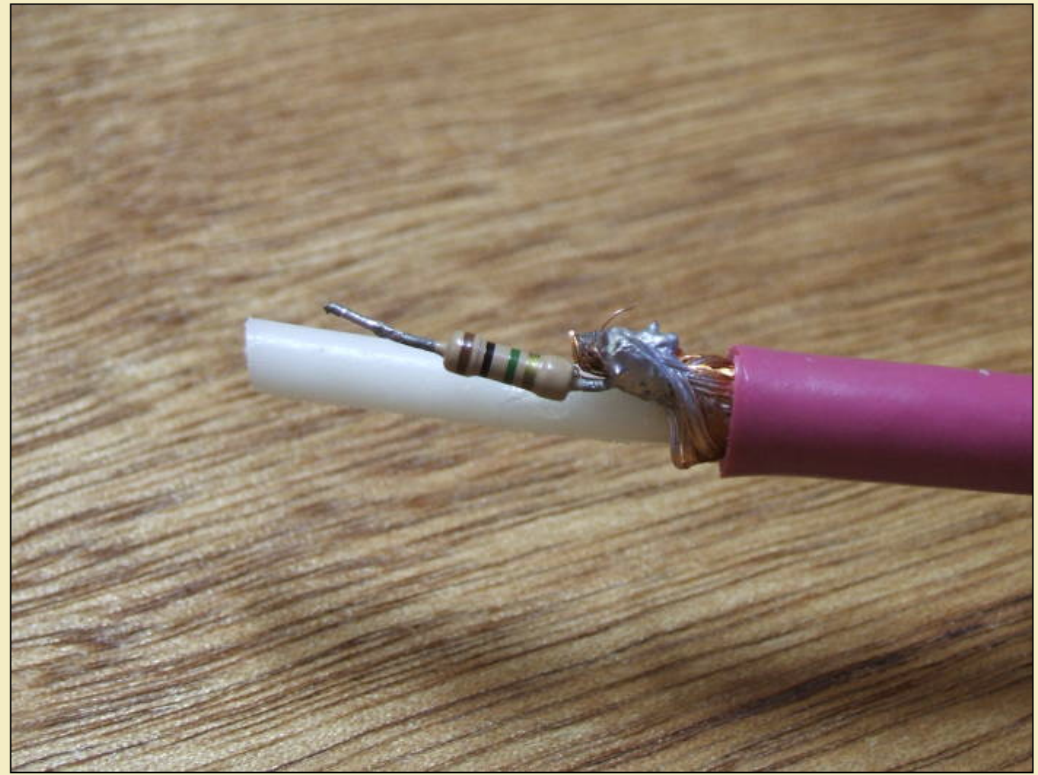
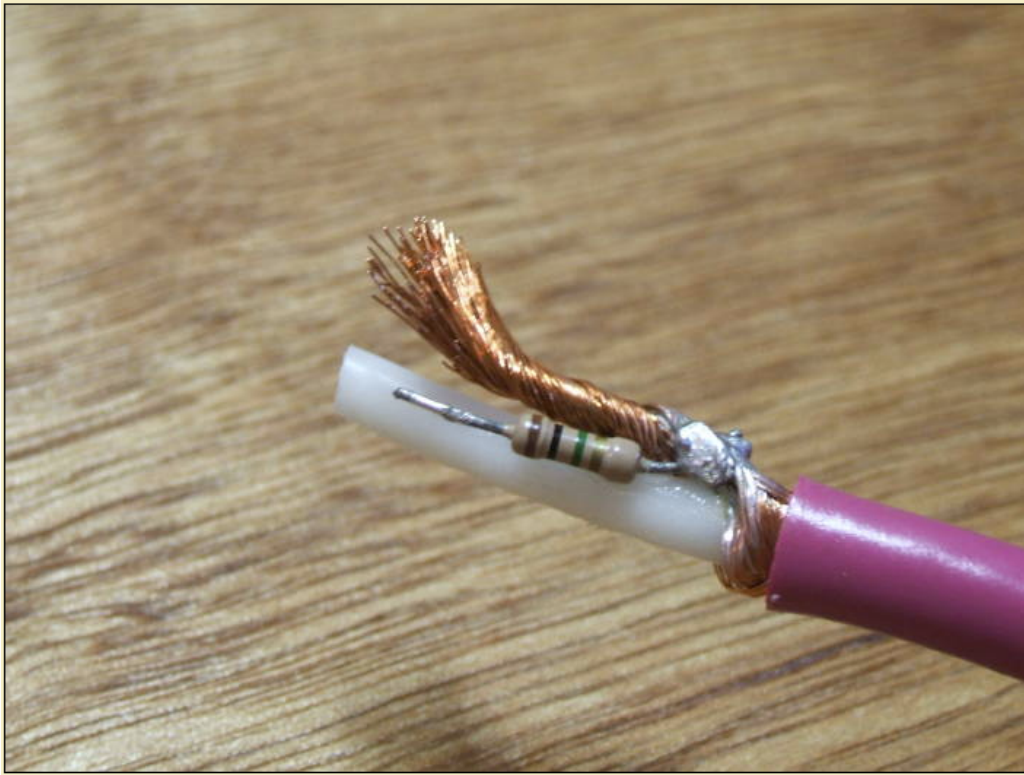


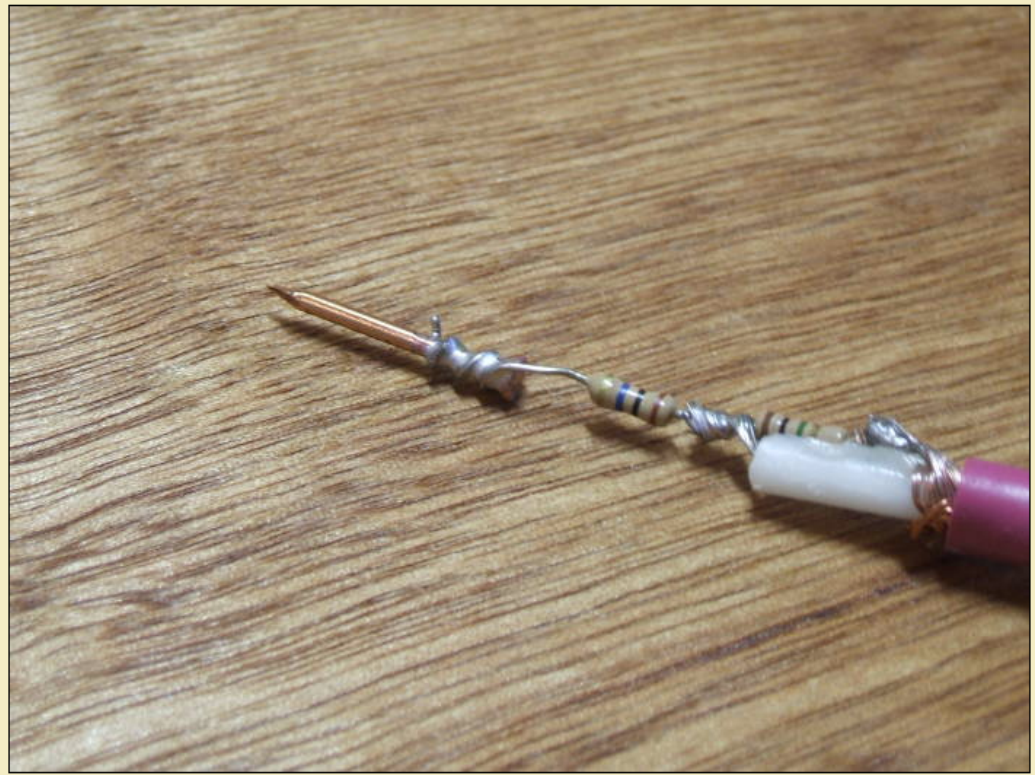
Here is the complete bill of materials:

- The pen
- A 2-meter piece of coaxial test cable with a BNC connector on one end
- Epoxy adhesive
- One alligator clip
- Copper-plated nail — 0.75" (20mm) long, packed as "weather-stripping nail".
- 1 M Ω and 5 M Ω resistors

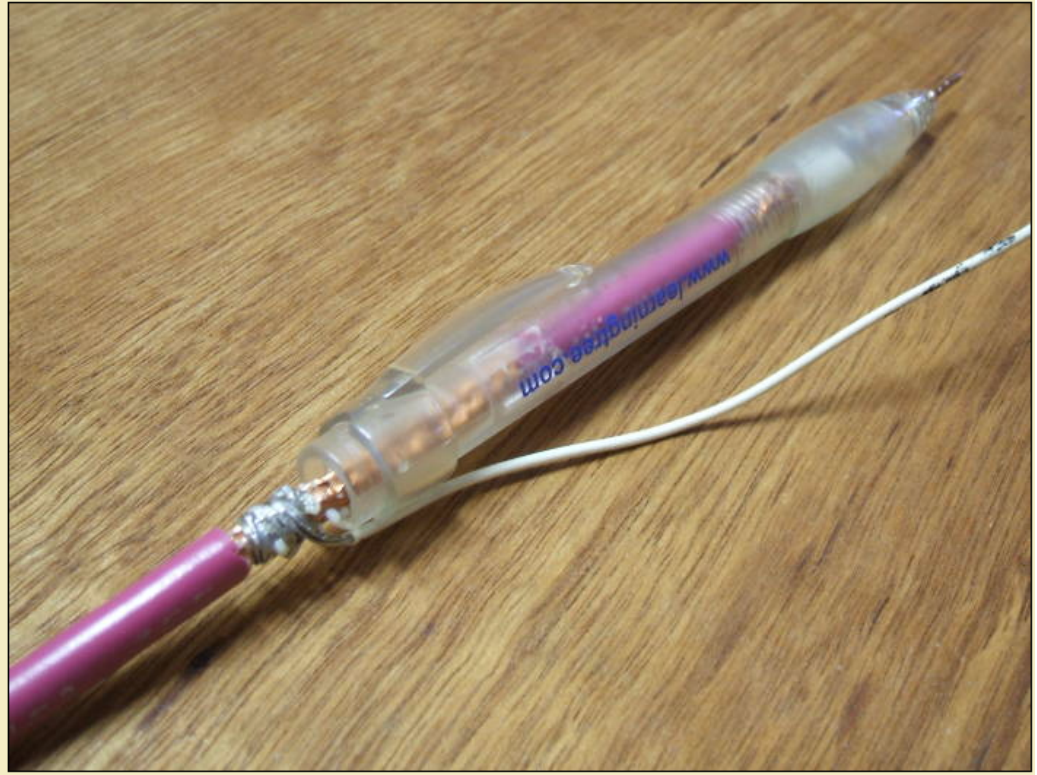


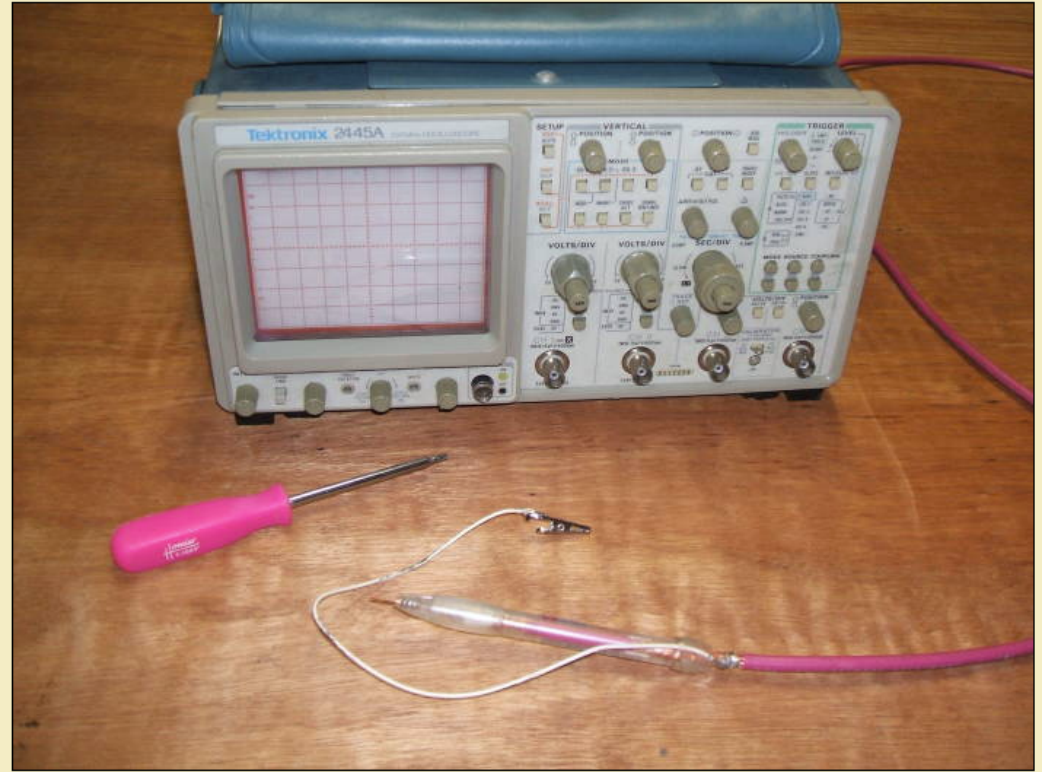


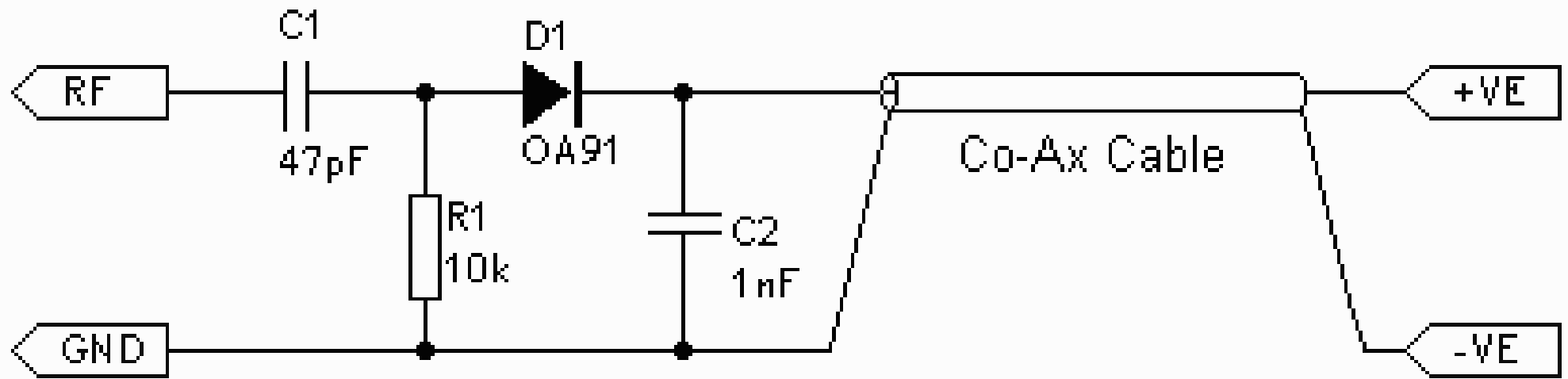


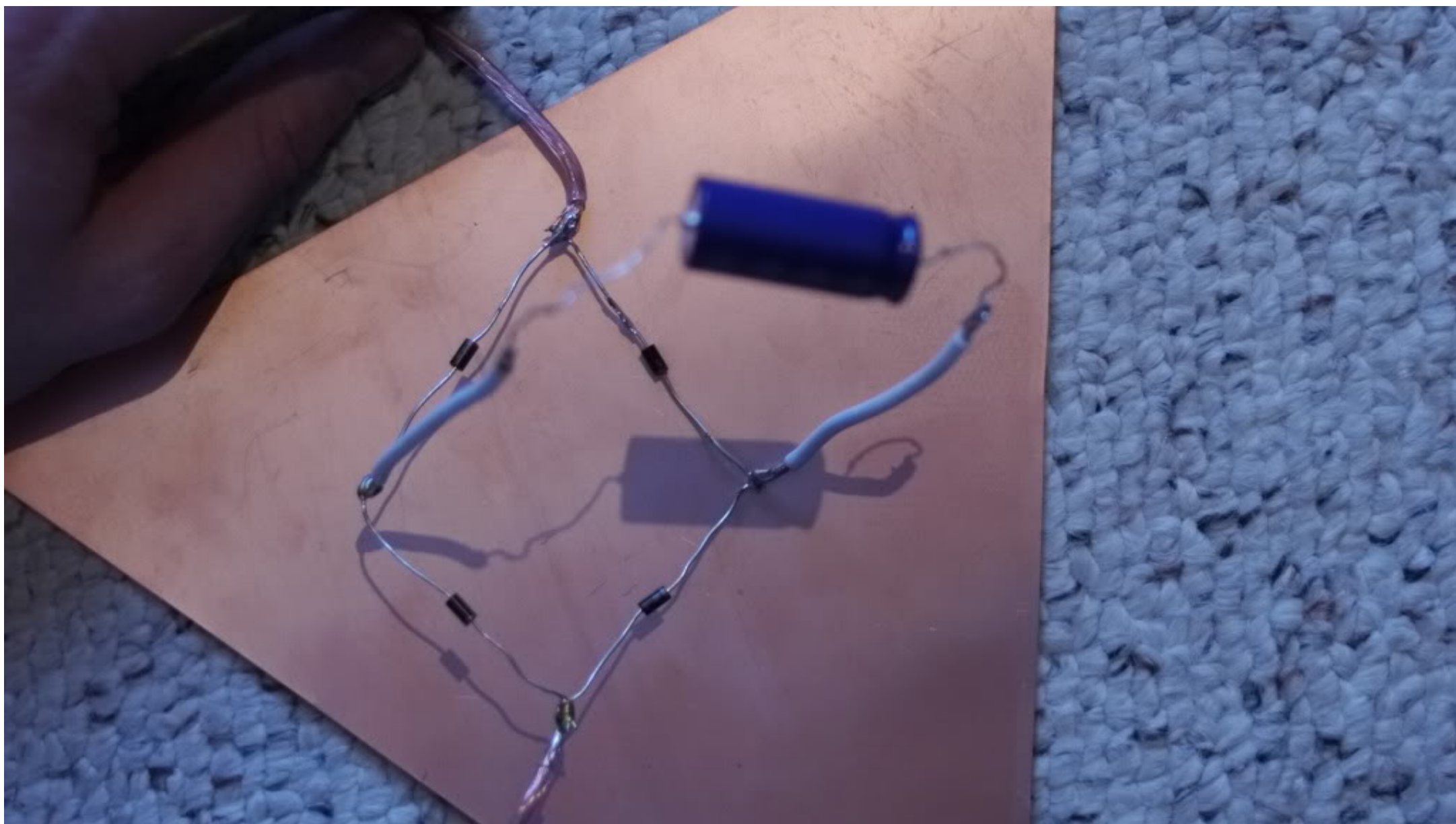




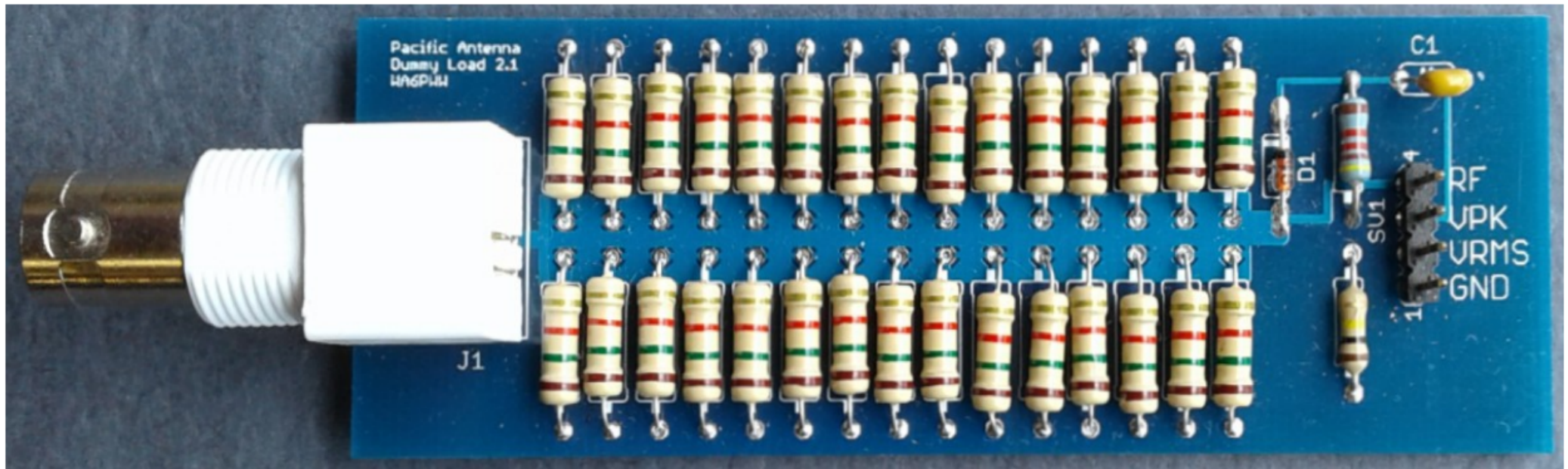








Pacific Antenna 15 Watt Dummy Load Kit

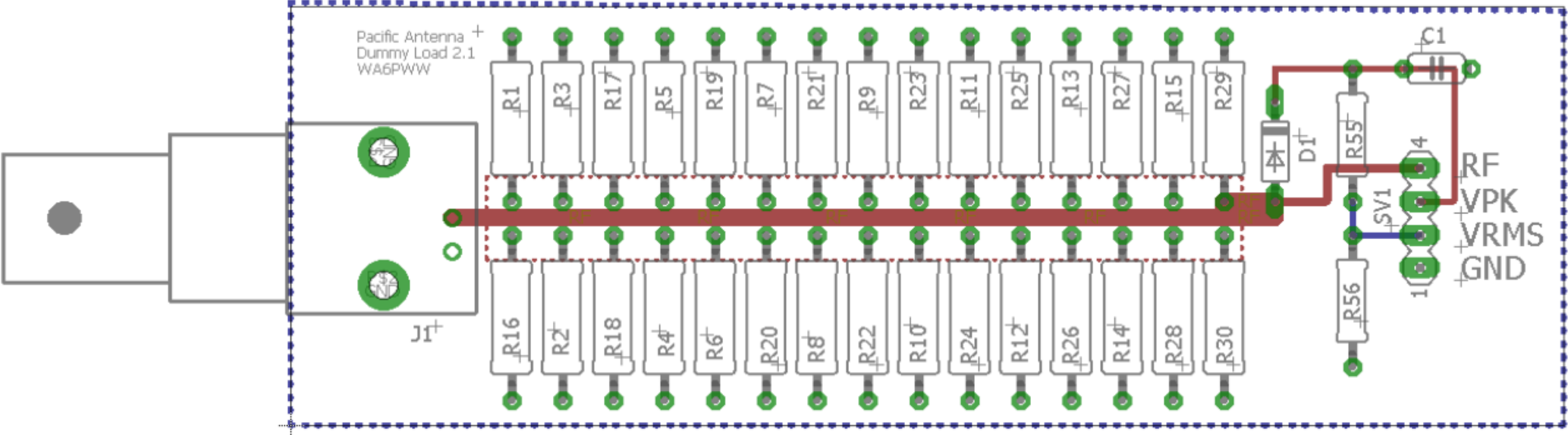


Inspection and Inventory

First, check the kit to be sure all parts are included. Should anything be missing, please contact us for a replacement.

- 30 – R1-R30, 1.5 K 1/2 watt resistors: Brown-Green-Red-Gold
- 1 – R55: 41.2K 1/4W, 1% resistor: Yellow-Brown-Red-Red--Brown
- 1 – R56: 100K 1/4W, 5% resistor: Brown-Black-Yellow-Gold
- 1 – D1: 1N4148 diode
- 1 – C1: 0.01uF monolythic capacitor, yellow, (marked 103)
- 1 – J1: BNC board mount connector
- 1 – SV1: 4 pin header
- 1 – Circuit board

Board Layout



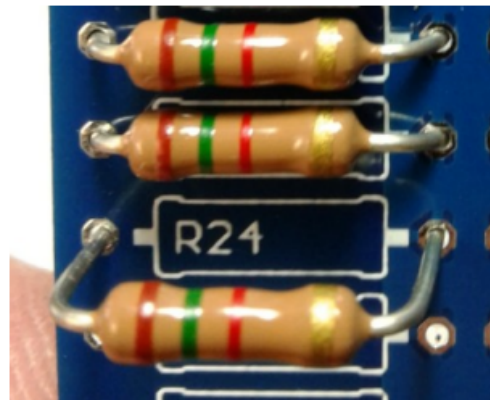
Assembly

Install R1- R30

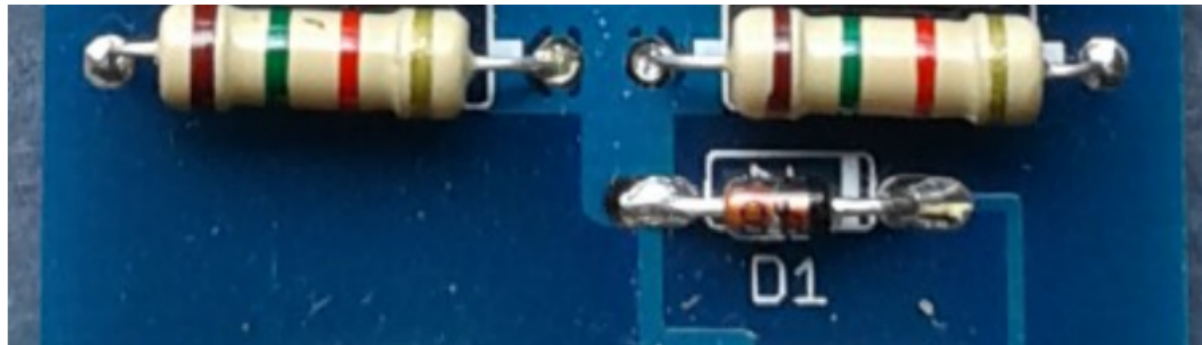
These are the 1/2W. 1.5K ohm resistors and they go in the marked locations shown on the circuit board.

You may find it helpful to do one row of the resistors at a time to make soldering the leads easier.

First, pre-bend the leads near the resistor bodies and then insert them into the board.



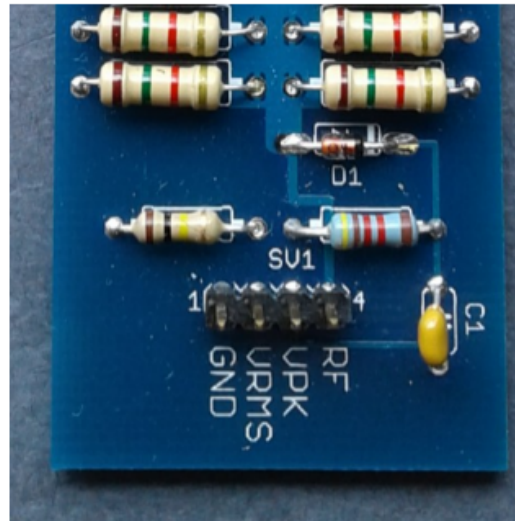
Install, solder and trim the leads of D1. Be sure to match the band end to the diagram above and the outline on the circuit board.



Install R55 the 41.2K ohm (Yellow-Brown-Red-Red—Brown) resistor in the marked location on the board

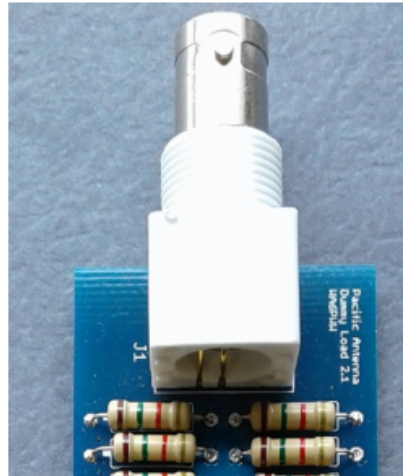
Install R56, the 100K resistor (Brown-Black-Yellow-Gold) in the marked location on the board.

Install C1 the 0.01uF capacitor in the location marked on the board.

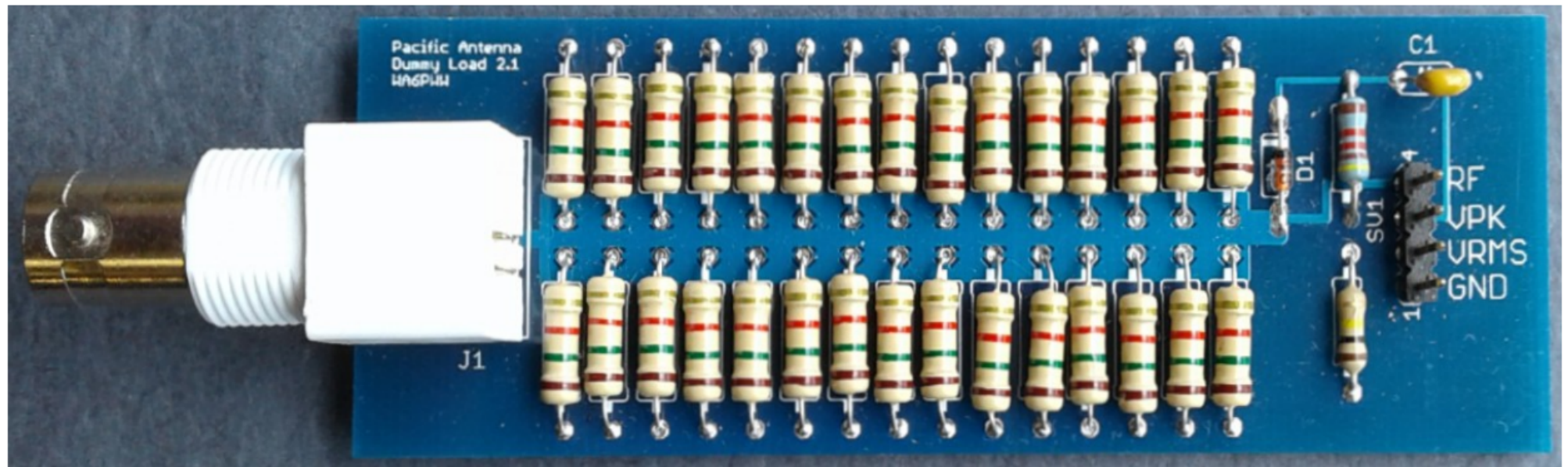


Now, solder the BNC connector, making sure to seat it fully into the board. Solder the two small wires and the two support pins.

The support pins may require longer time, increased temperature or a larger soldering iron to properly solder.



Congratulations, your dummy load kit is now complete!



Operation

The dummy load is easy to use. Simply connect your transmitter input to the BNC

To measure RF Power, connect your multimeter to pin 1 and Pin 2 or 3.

Pin 1 is ground and the DC output voltages appear on pins 2 and 3 of SV1.

Pin 2 provides the RMS value of the RF voltage.

Pin 3 gives the Peak value of the RF voltage.

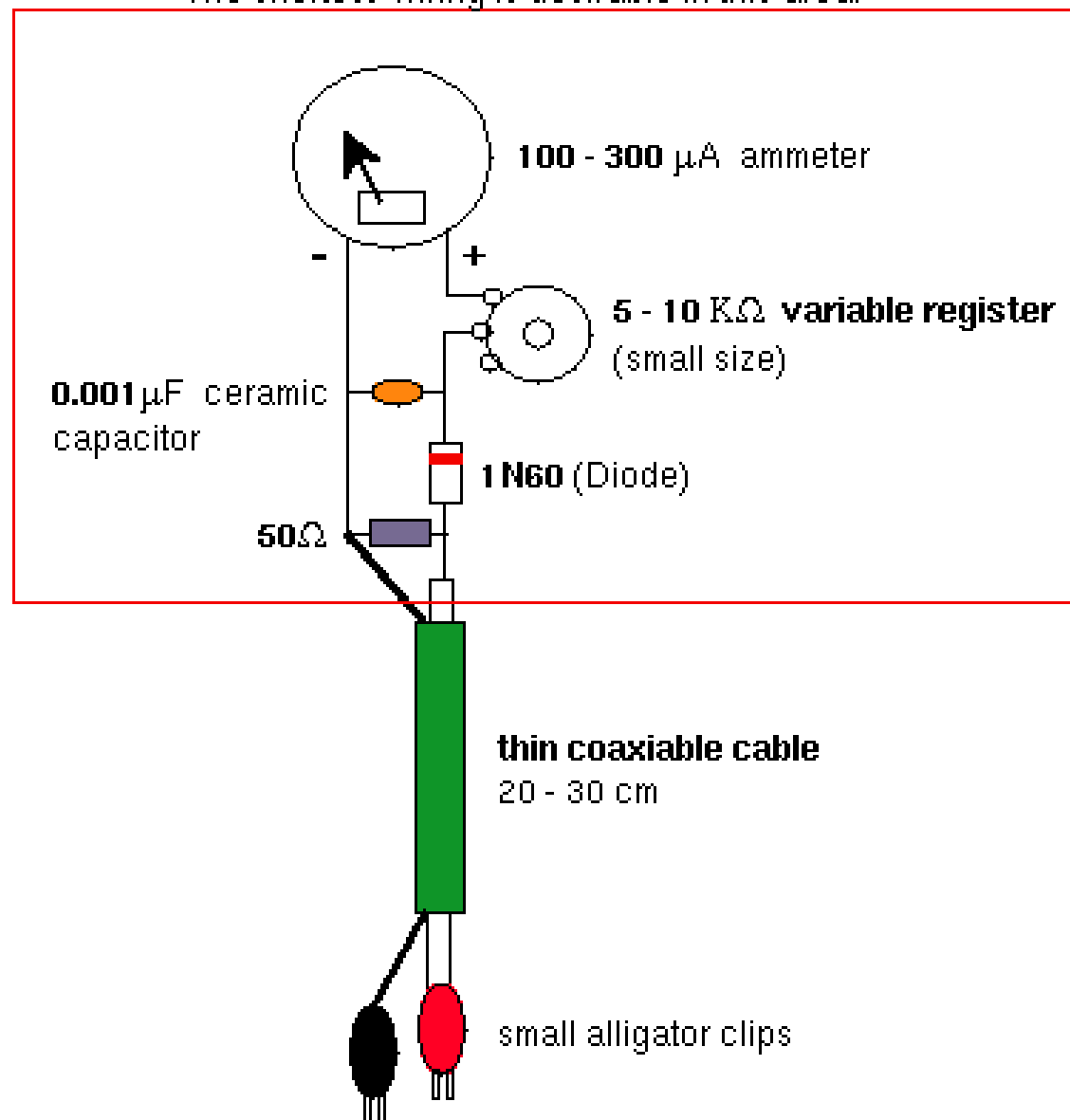
Pin 4 is direct RF voltage across the resistors.

RF power is calculated from this relationship: $\text{Power} = (V_{\text{rms}}^2)/50$

Note: The power input should be limited to 15W to avoid damaging the resistors and sense circuit components.

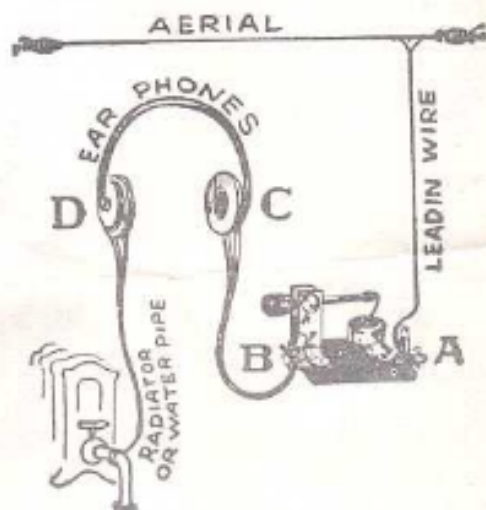
The simplest power meter

The shortest wiring is desirable in this area.



As for the ammeter, you can use an used one taking from junked audio amplifier, tape-recorder, radio-cassette, and so on.

Instructions for using Philmore Crystal Radio Detector



This Detector is a radio in itself, as it is possible to get reception with it alone, provided you are within 25 miles of a broadcasting station. Under very favorable conditions reception is sometimes possible at much greater distances.

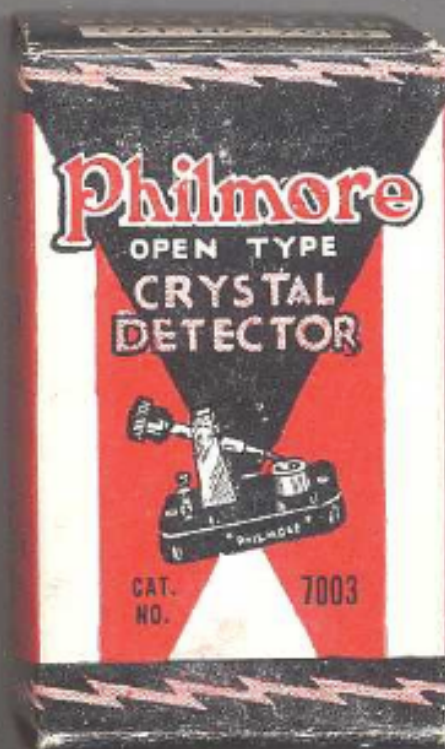
In order to get reception, you need an aerial kit and headphones. The AERIAL may consist of 100 to 125 feet of copper wire and two insulators. Attach insulators to each end of the wire. Stretch the wire allowing as little sag as possible. No part of this wire should touch any portion of the building or any other obstruction.

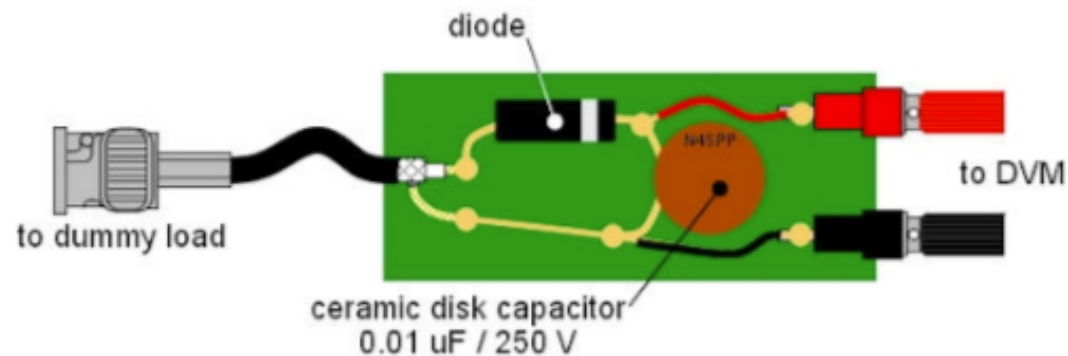
The LEAD-IN may consist of any desired length of covered wire which will reach from the aerial to the set. Scrape each end of the lead-in so that the wire is absolutely clean. Wind one end securely around the aerial wire. Place the other end in the clip marked "A".

There are two cords leading from the headphones. Connect the cord "C" as illustrated, from the earphone to clip "B" or the clip under the detector arm. The other wire from the earphone marked "D" is to be connected to water pipe, radiator or any other suitable connection to be used for the ground.

You are now ready to receive broadcast. Find a sensitive spot on the crystal by means of the cat-whisker. You may find it necessary to "hunt" for live spots on the crystal as only some parts of a crystal are sensitive, and unless you find these sensitive spots you will not hear anything.

If you do not at first get results, do not blame the detector, as every set is tested before being shipped and will positively get results under the proper conditions. Do not write in and ask what the trouble is for a personal examination of your entire hook-up will be necessary. Go over your aerial, ground, various connections, etc., and if necessary get someone who thoroughly understands radios to help you.



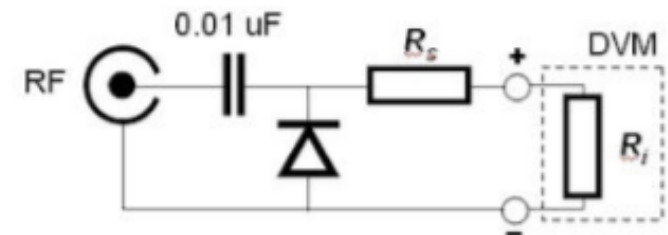
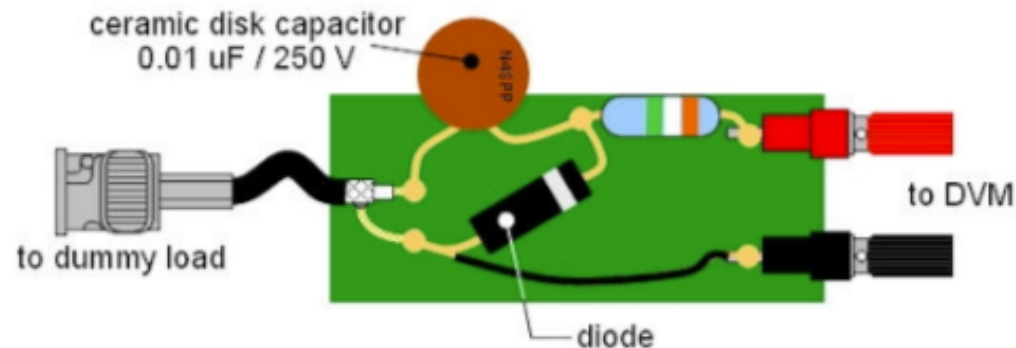


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A simple RF-probe

Obviously, this circuit will be fooled by a DC-offset on the RF signal. We can fix this by swapping the diode and the capacitor. Note that this is not necessary if you measure an RF voltage via a transformer, such as a [directional coupler](#).

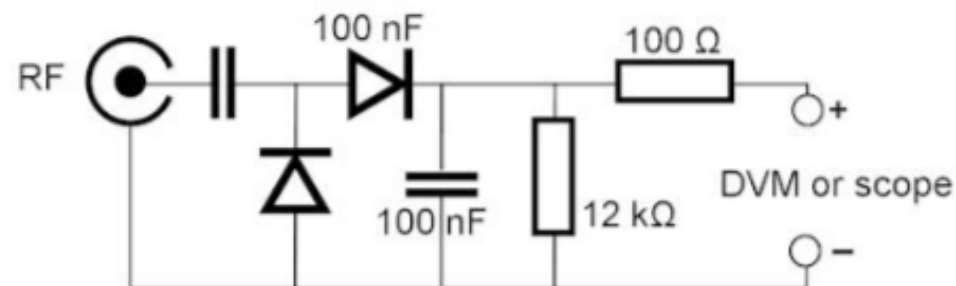
We can also make life a little easier by including a voltage divider with a scaling factor that is equal to the reciprocal of $\sqrt{2}$. Then the output voltage will be the RMS value that we are interested in. We can make a voltage divider where one resistor is the input impedance of the DVM. My DVM has a published input resistance of 10 M Ω . The second resistor should be 4M14 Ω , since $10 / (10 + 4.14) = 1 / \sqrt{2}$. So 3M9 + 220k = 4M12 would be a good choice. This approach is shown below. Note that the resistor should be non-inductive (e.g., bulk-metal-foil or carbon).



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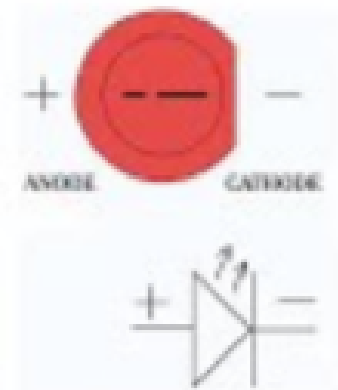
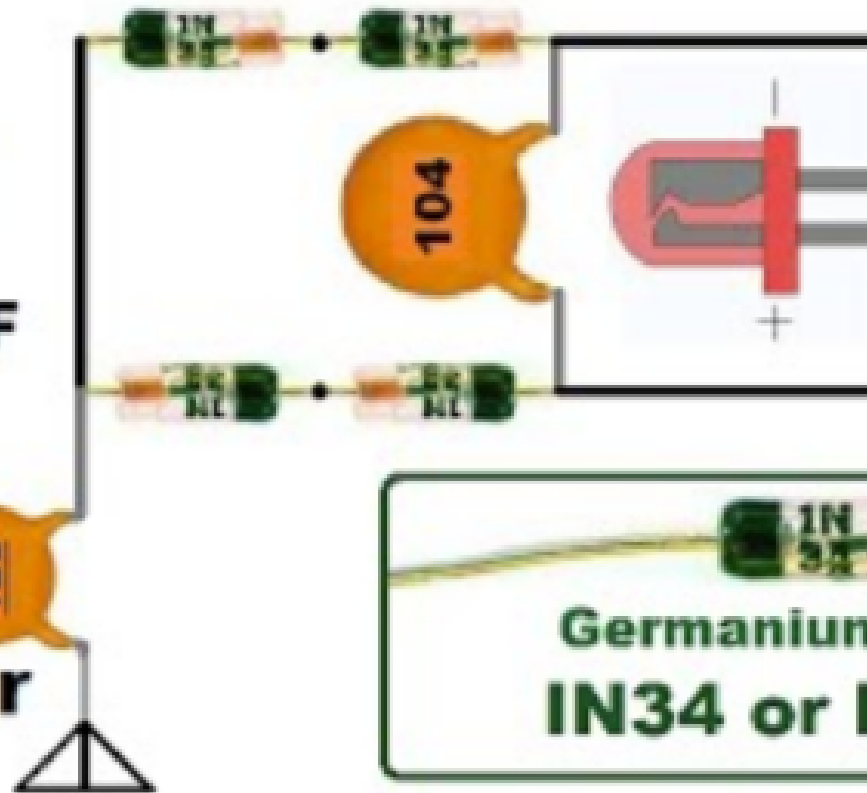
RF-probe with DC-block and peak-to-RMS scaling

A variation on this, with a full-wave rectifier, is shown below:

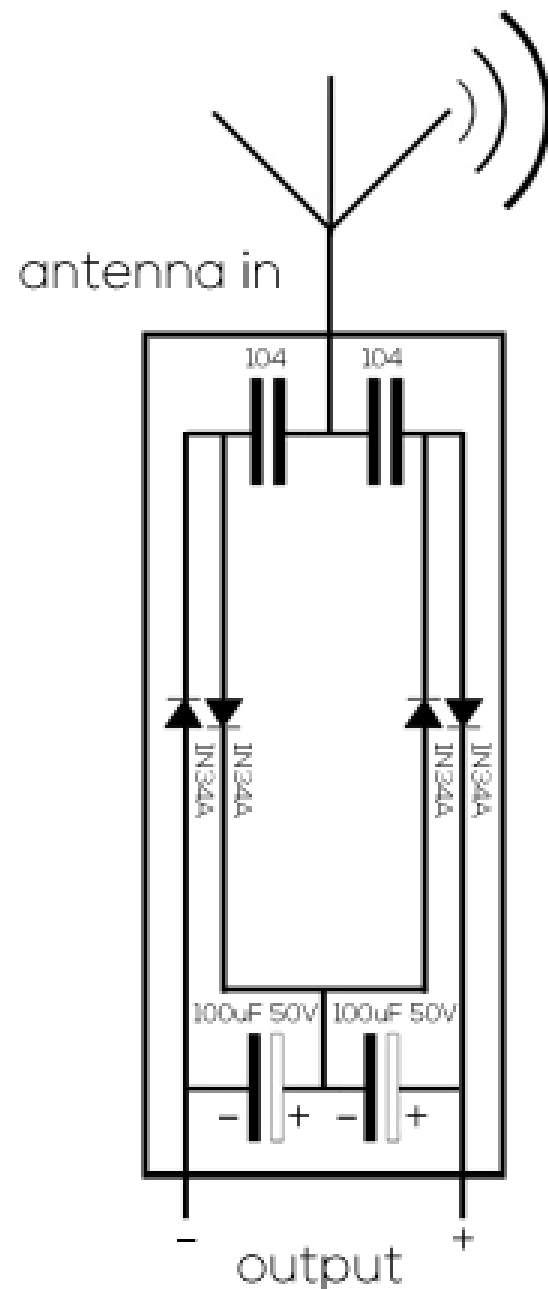


123 .01
10NF
104 .1
100NF

**Ceramic
Disc
Capacitor**



**Germanium Diode
IN34 or IN34A**



RF to DC

Circuit Diagram (simplified)

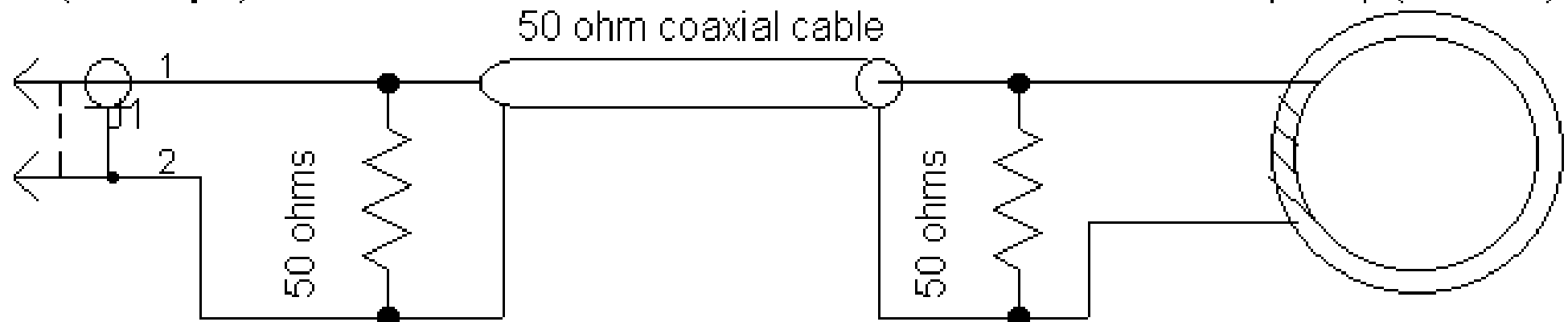
Component list:

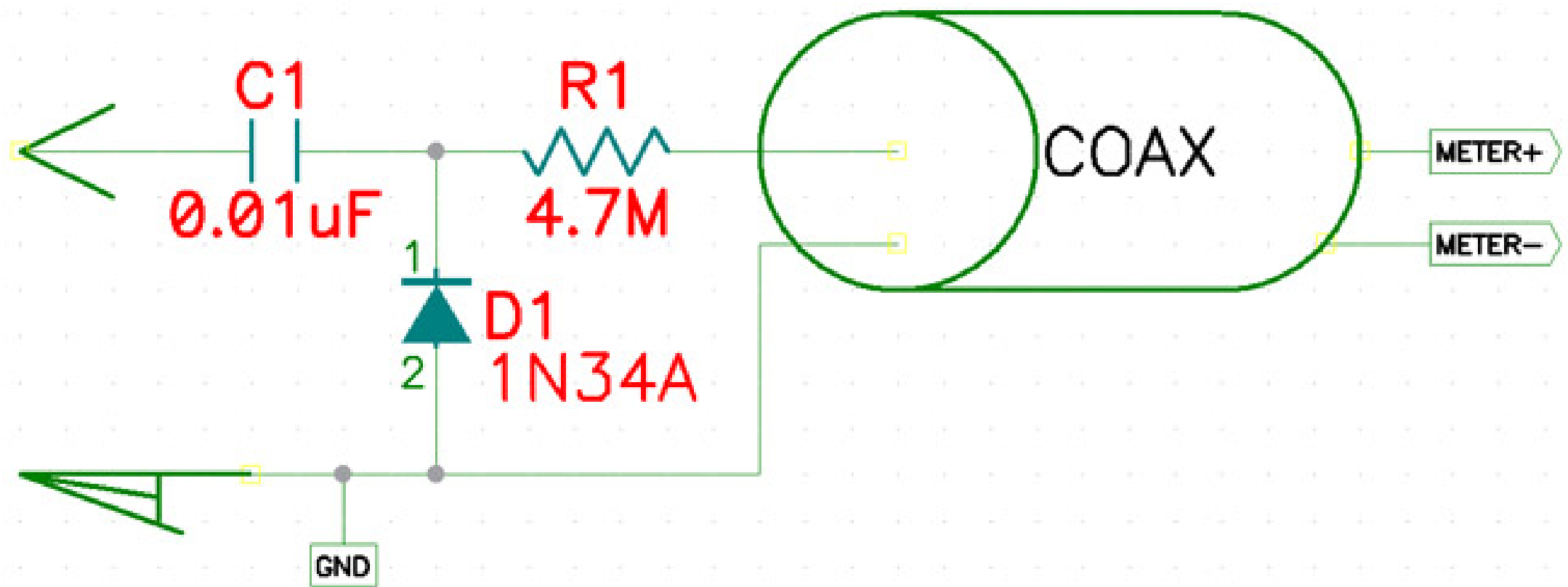
- (2) Ceramic Capacitors (104)
- (4) Germanium Diodes (1N34A)
- (2) Electrolytic Capacitors (100uF 50V)

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RF Current Probe

BNC (to scope)

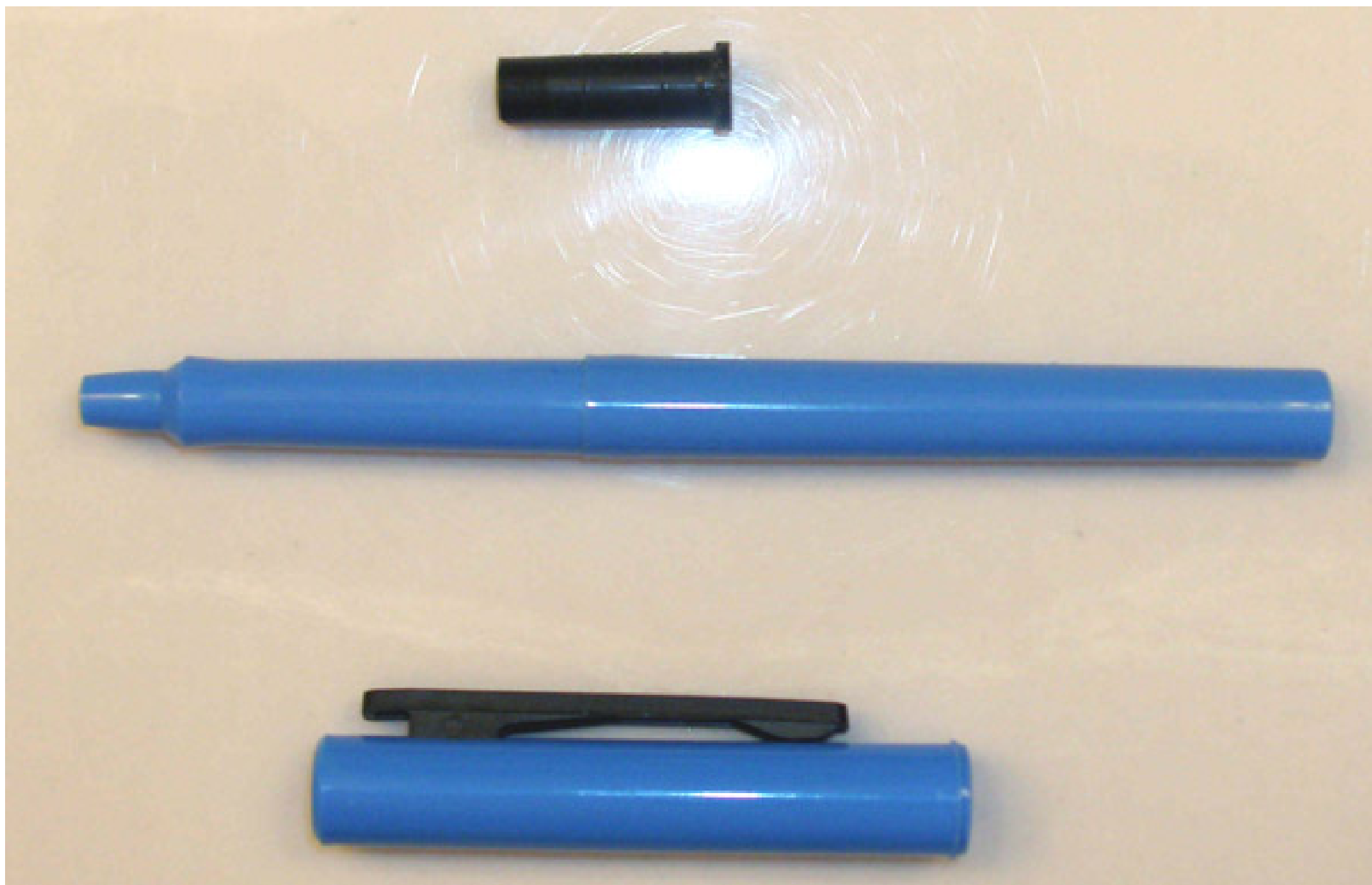


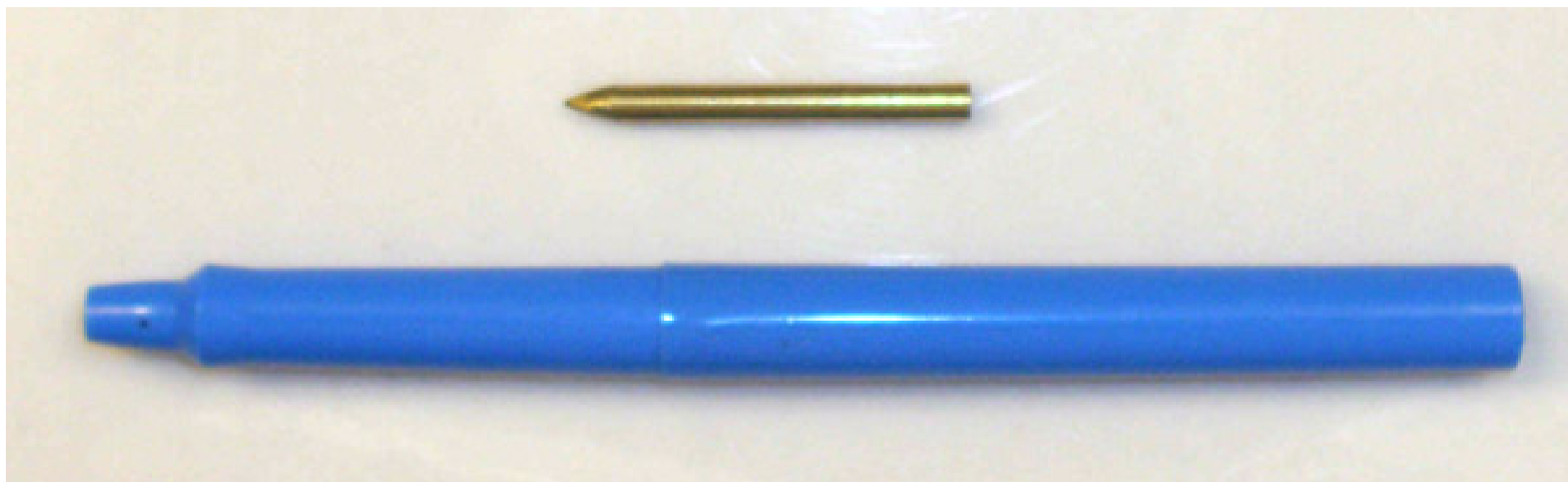


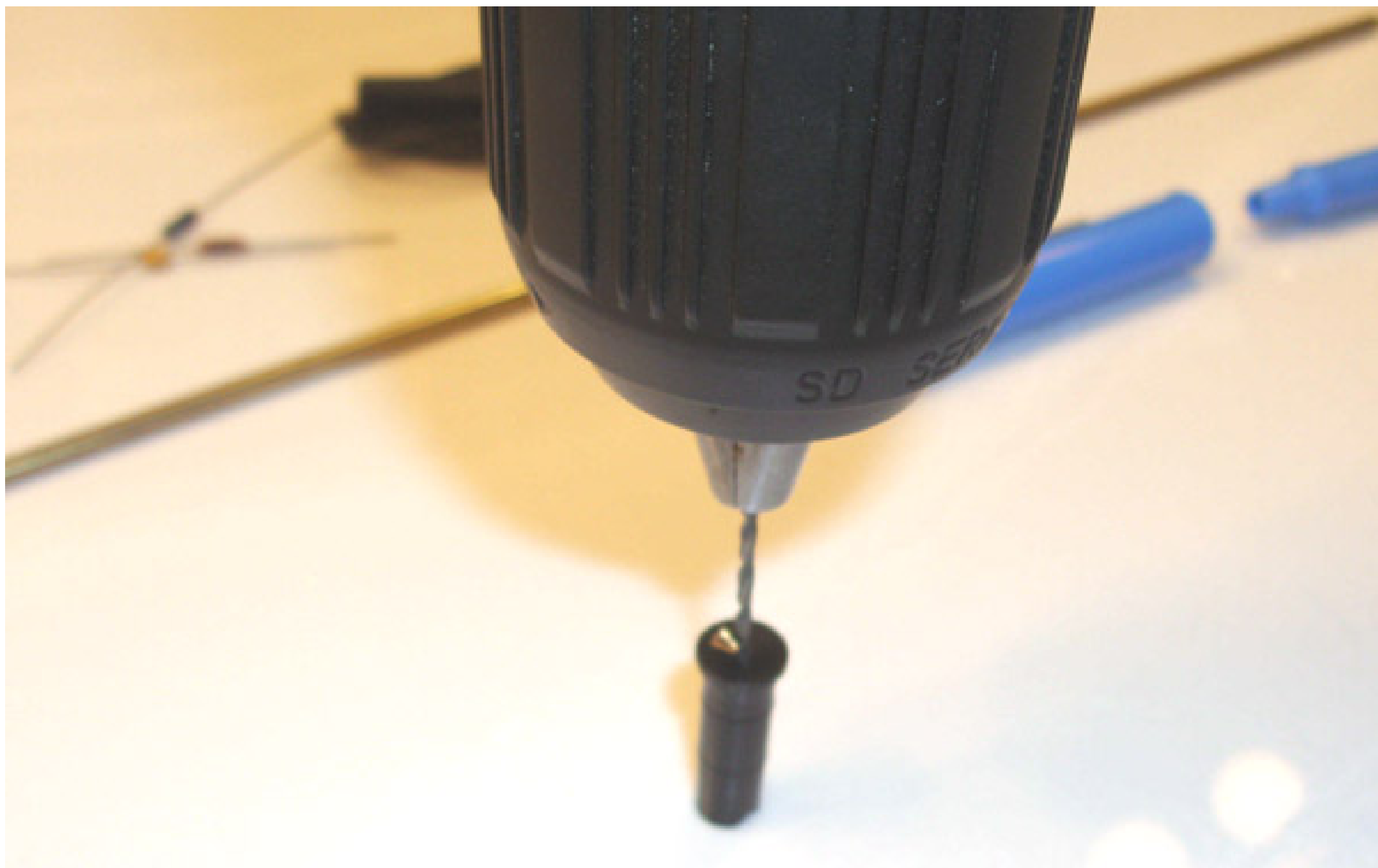
Simple RF Probe







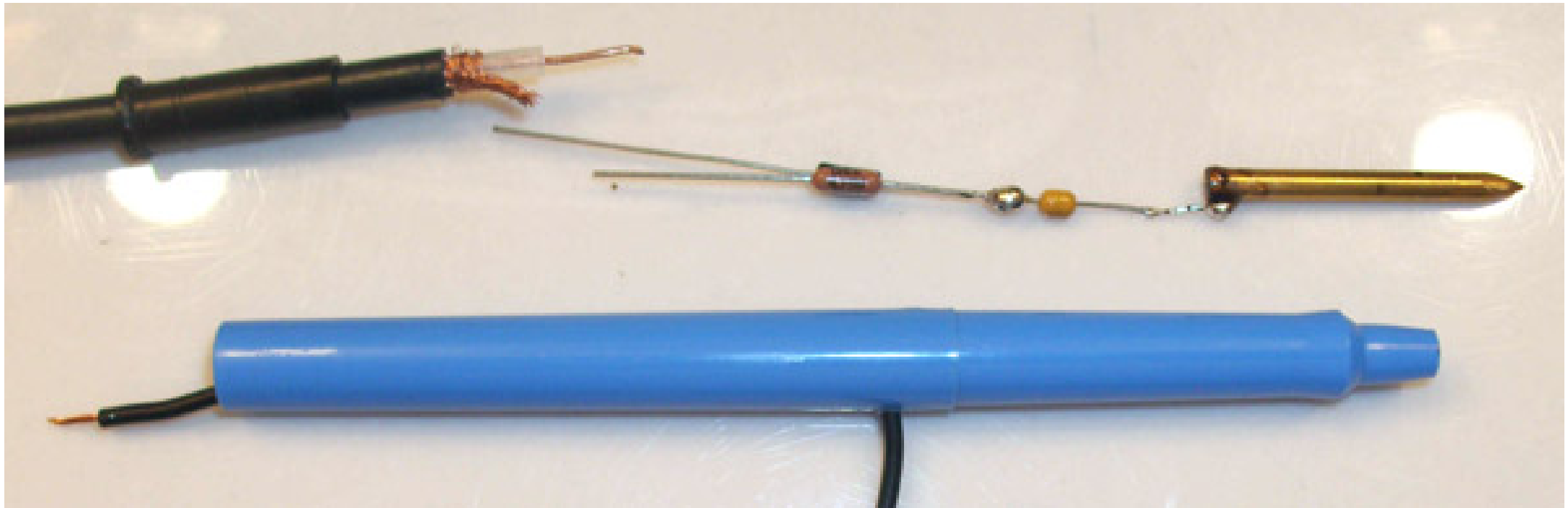


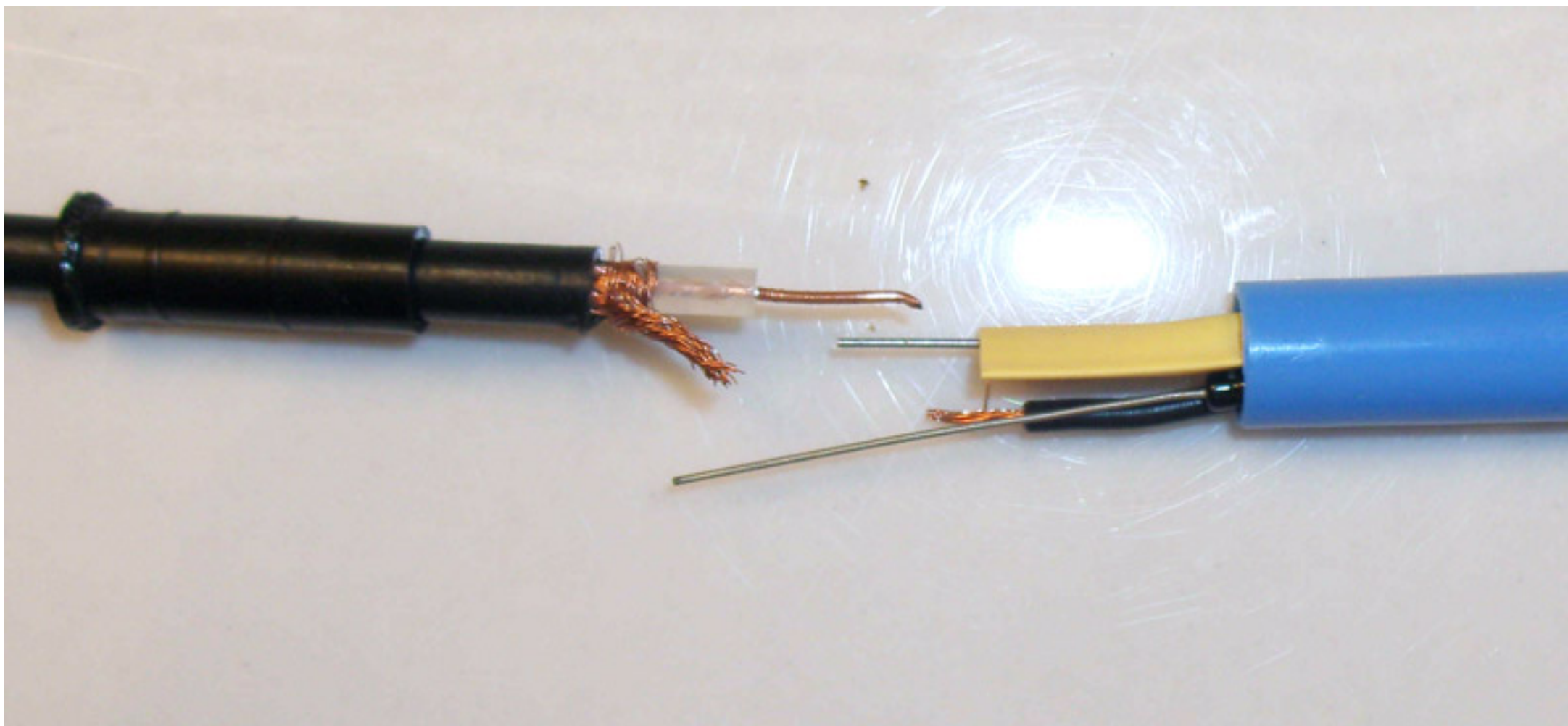


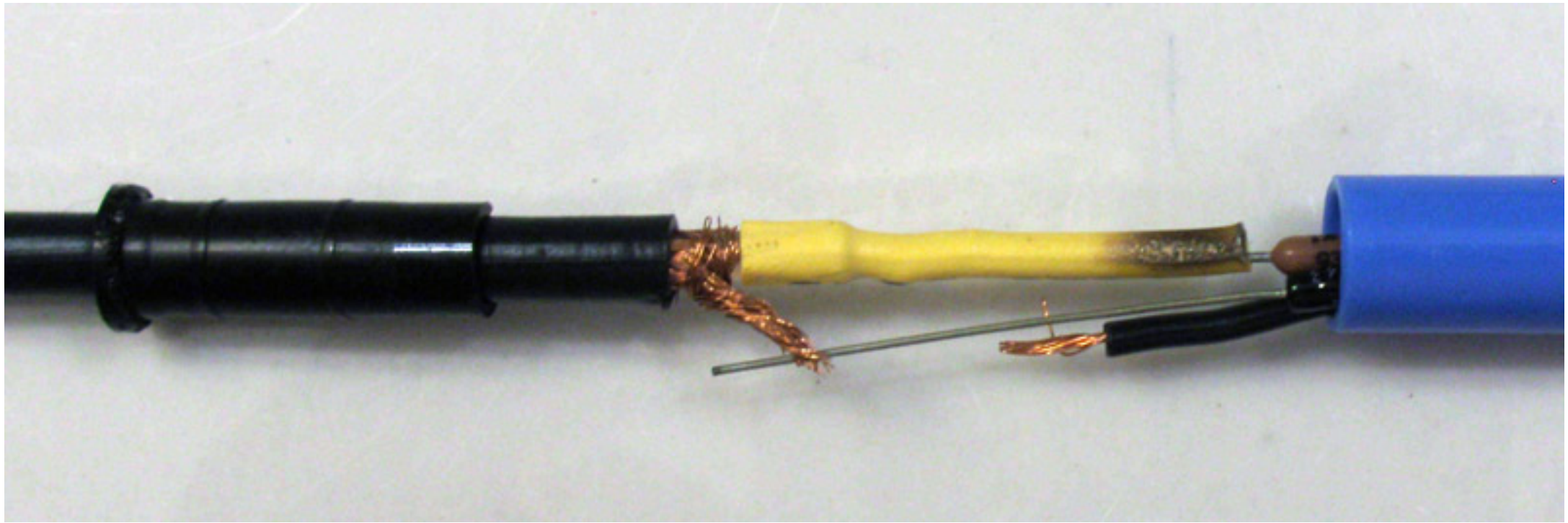










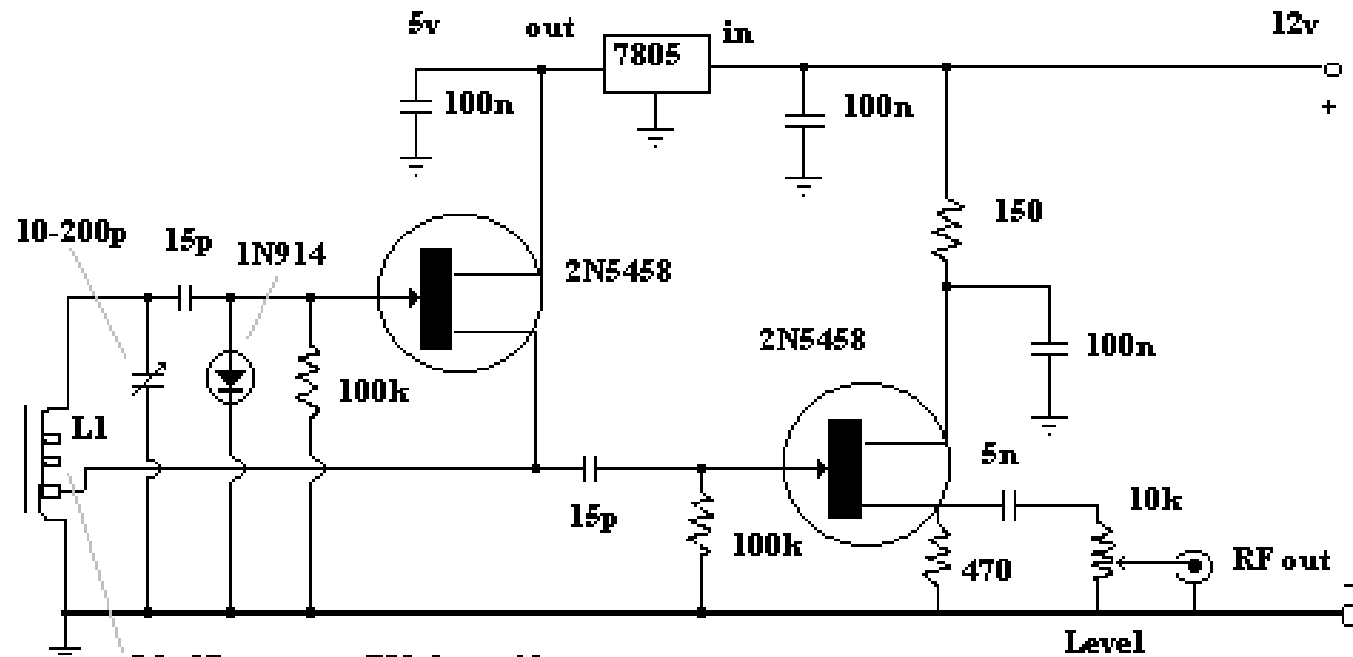








RF Signal Generator



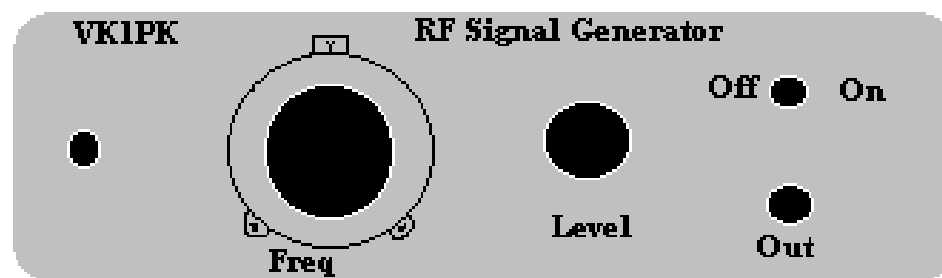
L1: 37 turns on T50-2 toroid.

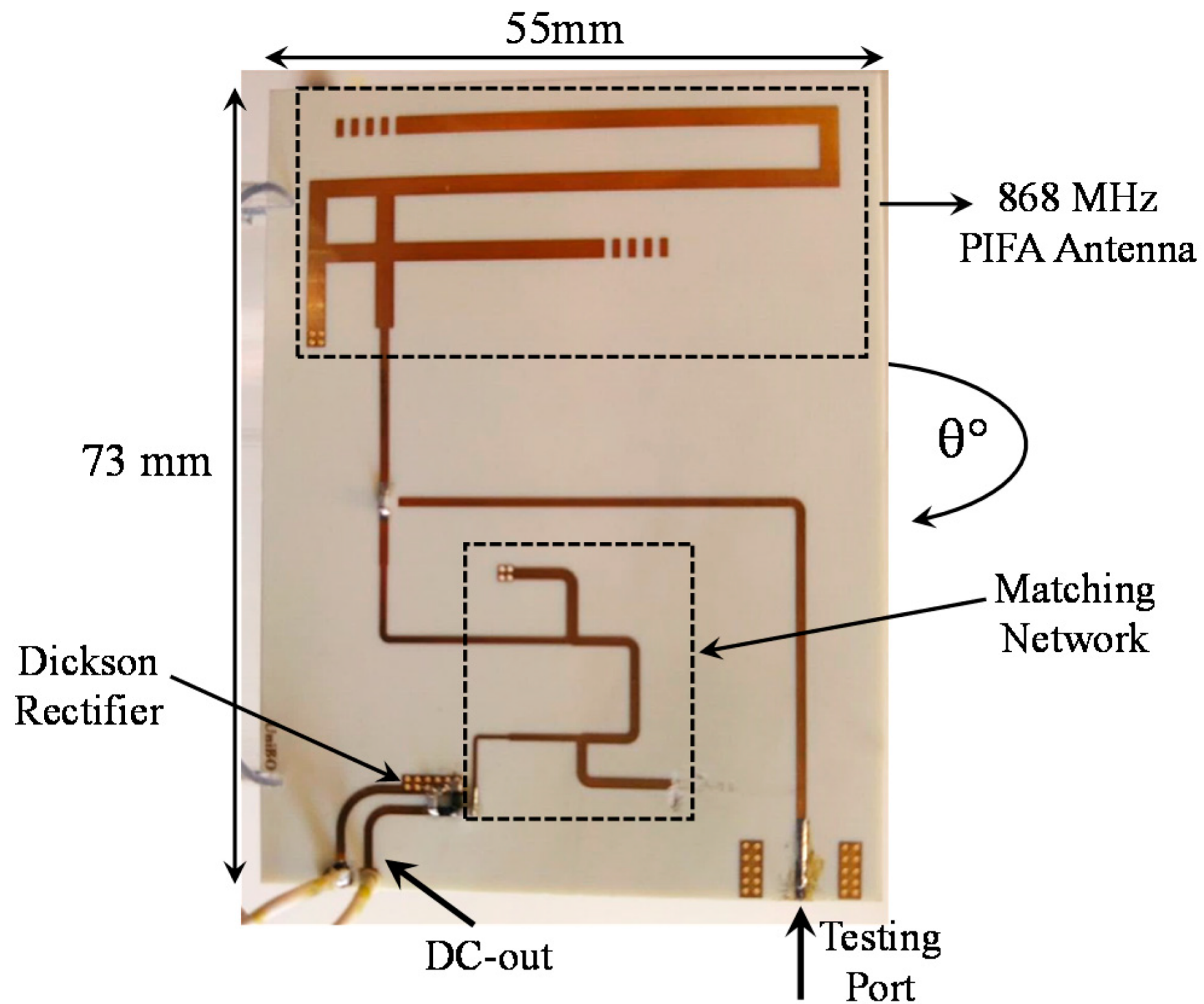
Source tap 12 turns up from earth.

Coverage: 3-12 MHz approx

Notes:

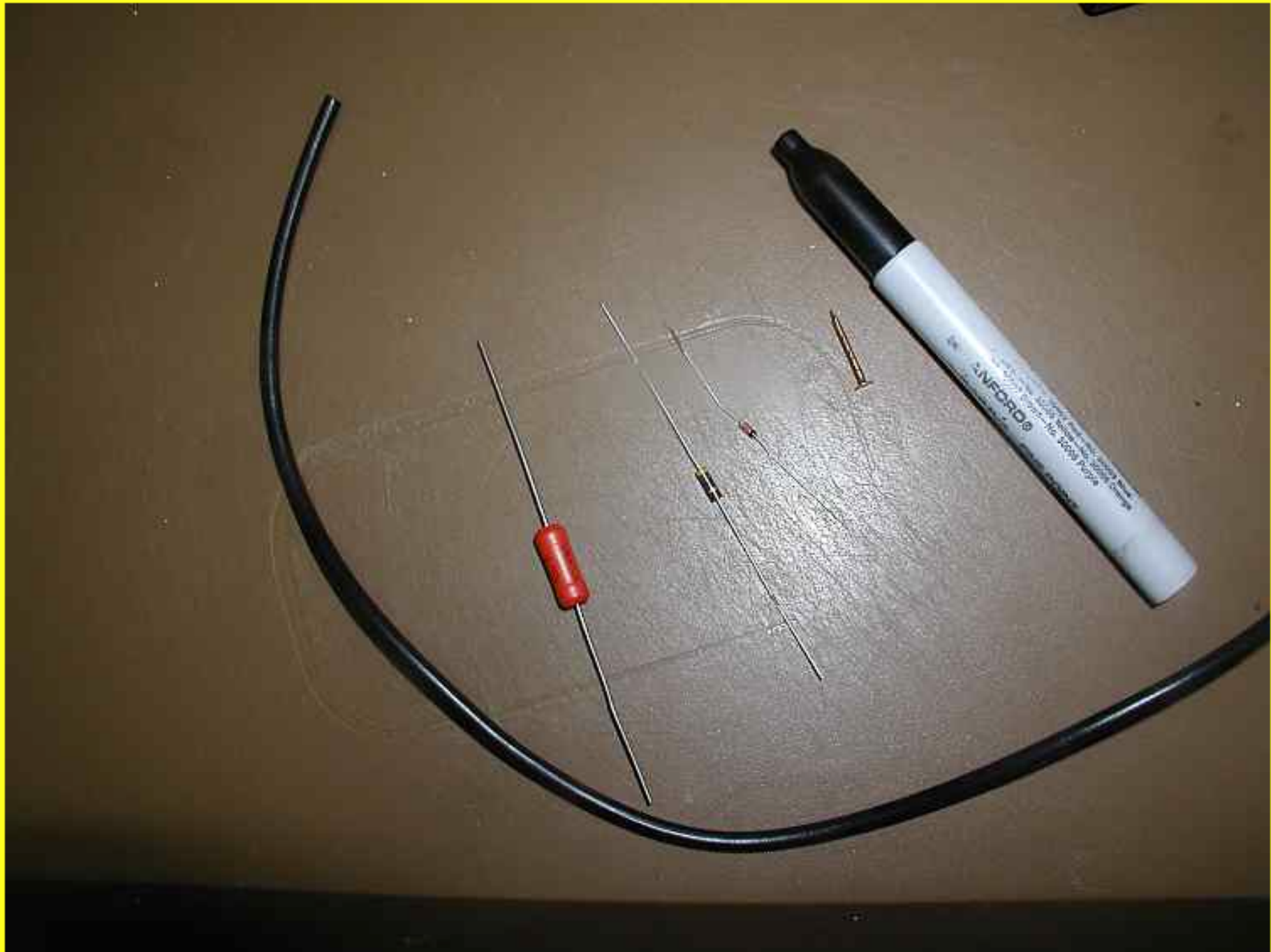
1. A vernier reduction drive is desirable.
2. Build signal generator in die cast aluminum box for best stability.
3. Can work up to 148 MHz on harmonics if care is taken in construction.
4. Any construction method should work but ensure components are rigid.







I used a .02ufd cap because it was the perfect physical size, a 4.7 meg resistor, and a 1N34A diode. I had a nice, flexible, copper nail that would be easy to solder to for a tip.







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NOT A KIT — FACTORY WIRED AND TESTED

SIGNAL GENERATOR

- Covers From 250 KC to 120 MC in 5 Bands
- High Stability Electron Coupled Oscillator
- Attenuator For Both RF and Audio Circuits

SIGNAL TRACER

- Hi-gain Cascade Pre-amplifier
- Front Panel Output For VTVM, Scope or Phones
- Low Distortion Triode Output Stage
- Separate R.F. and Audio Signal Probes

Two test instruments in one! The Signal Generator will serve as a full service instrument and the Signal Tracer will follow any signal whether generated by a broadcasting station or injected by the Signal Generator section. When used in combination, with no dependence on outside signals, the unit provides ideal service, for unlike any standard signal tracer, it first injects its own signal then traces that controllable signal to locate the source by standard signal tracing technique. Designed for use with AM, FM, TV and audio circuitry. Features 5 frequency ranges and an attenuator switch to control both the R.F. signal (either modulated or unmodulated) and the 400 cycle audio tone. Front panel output jacks which can be used for oscilloscope, VTVM or earphone connections. Housed in a beautiful crackle finish steel cabinet with a deep etched aluminum panel. Dimensions: $7\frac{1}{2} \times 9\frac{1}{2} \times 5\frac{3}{4}$ ". Complete with 2 probes. Shpg. wt., 9 lbs.

SPECIFICATIONS

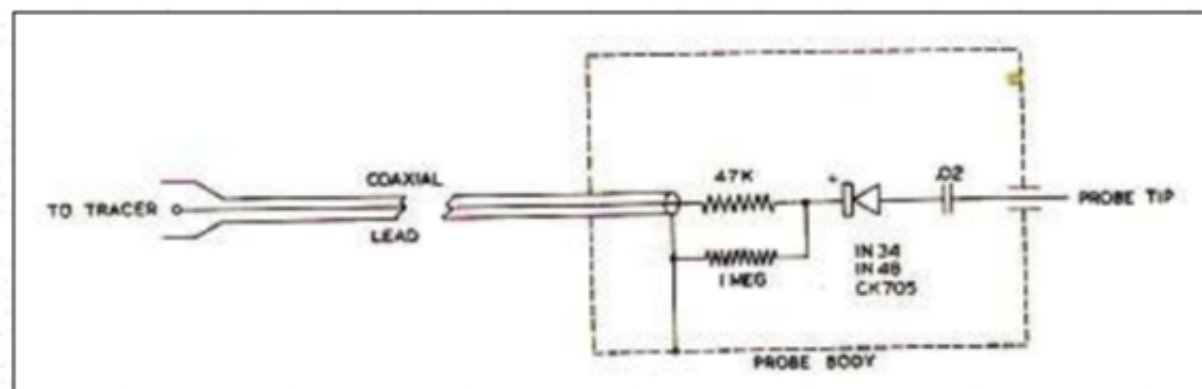
RANGE: Band A: 250KC to 850KC; B: 850KC-3000KC; C: 3.0MC to 11MC; D: 11MC to 45MC; E: 35MC to 120MC; 400cps audio signal; modulation slide switch, RF/AF attenuator and power switch; Signal output jack; AF input jack, 2 Preamp. output jacks. $4\frac{1}{2}$ " alnico 5 speaker. Tubes: 5687, 6350, 6AG5 plus sel. rectifier.

Net 24.95

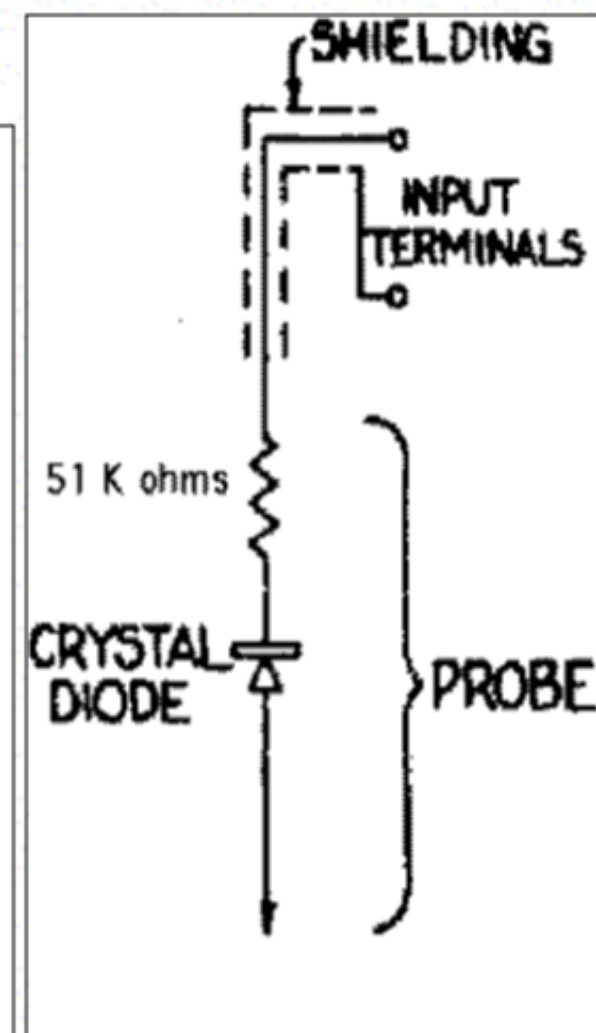
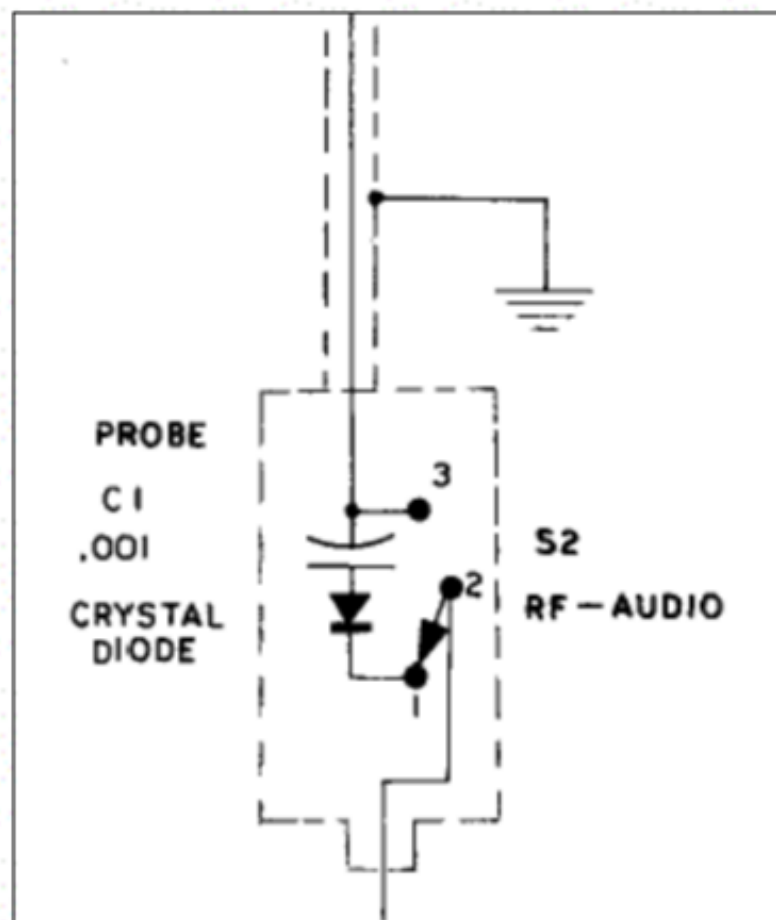


ONLY **24⁹⁵**

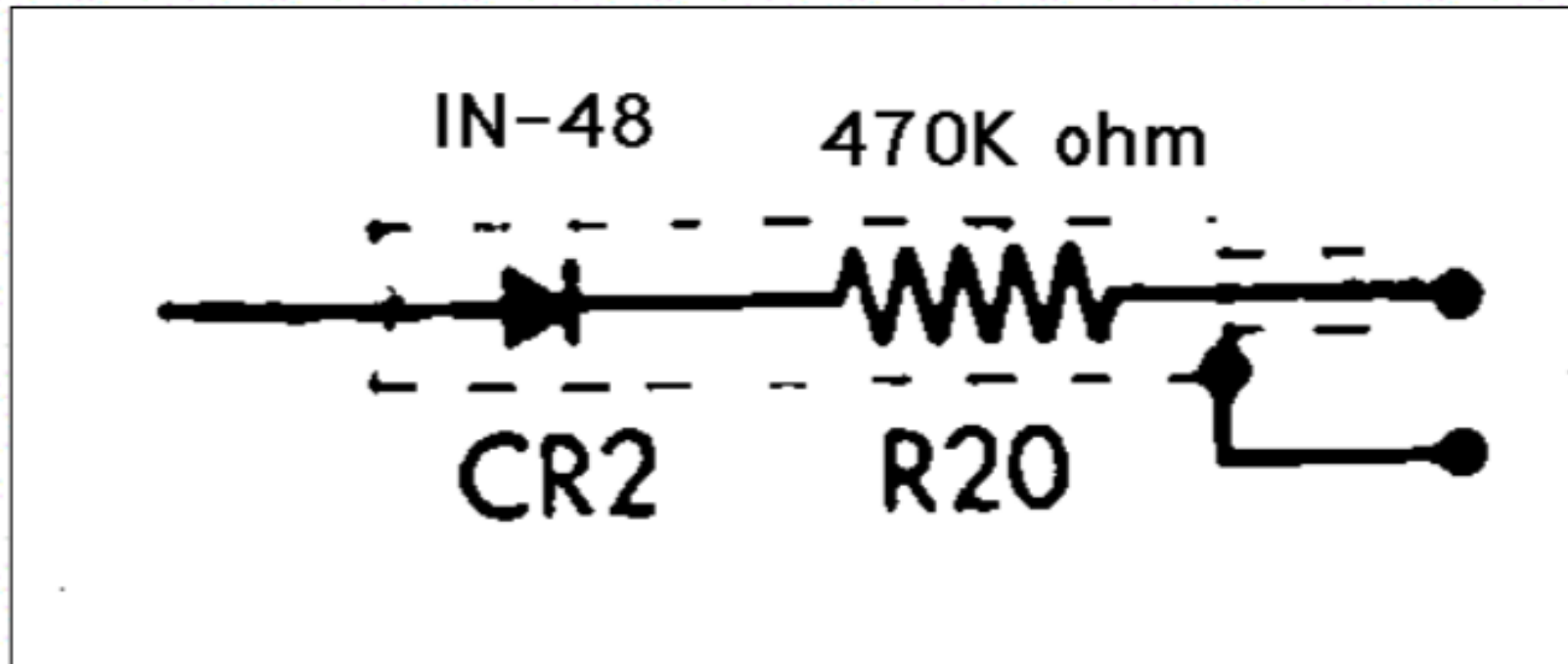
Made in U.S.A.



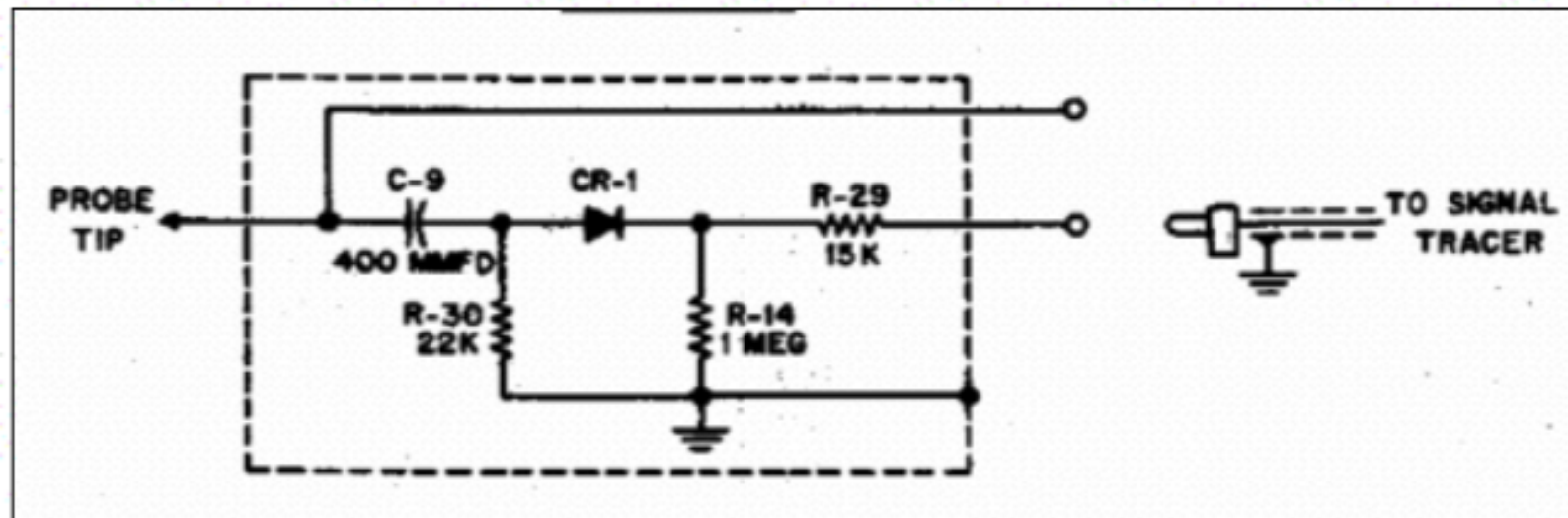
Heath T-3 signal tracer probe



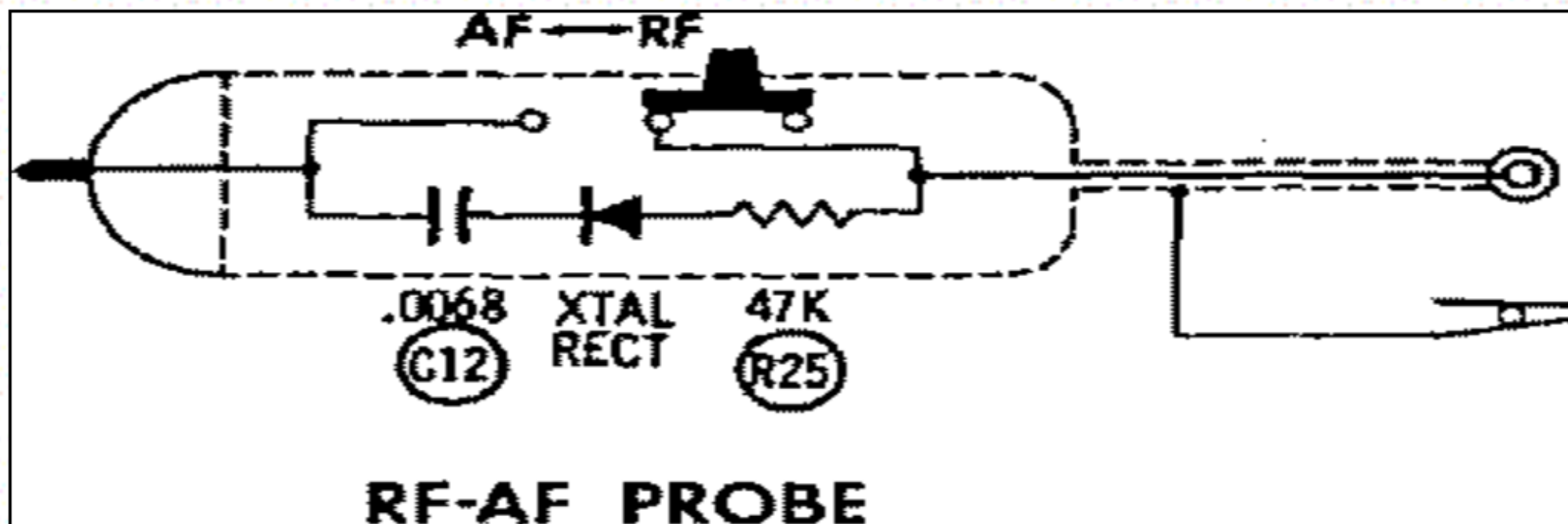
Heath T-4 or IT-12 signal tracer probe (left) - - - - Eico 145 signal tracer probe (right)



Eico 147a signal tracer probe



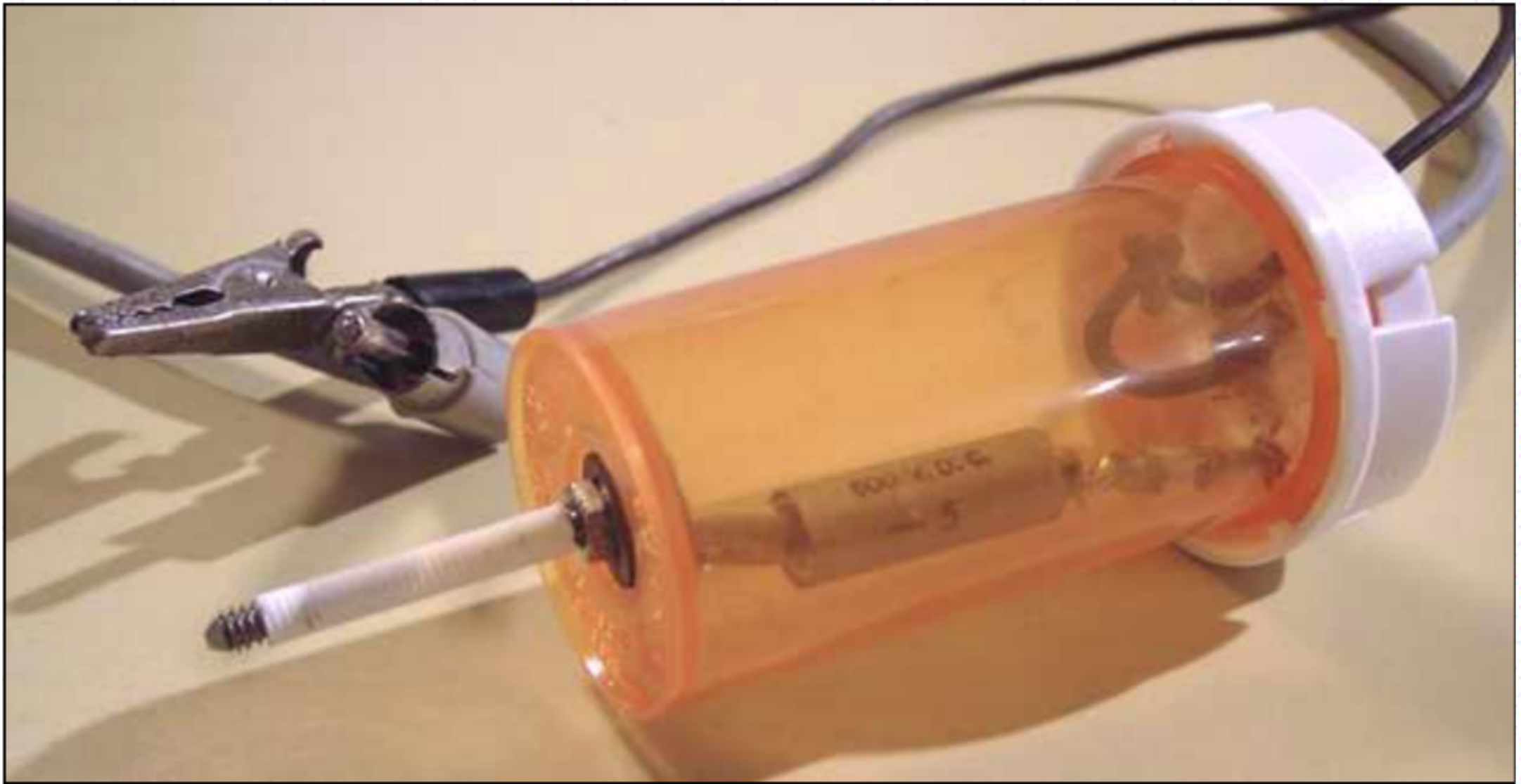
Knight-kit signal tracer probe



PACO Z-80 signal tracer probe



Pill bottle signal tracer probe



KIS (Keep It Simple) pill-bottle signal tracer probe



Accurate Instrument model 153 and its RF probe schematic
courtesy of John Lescaud.

